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FORTIETH ANNUAL REPORT

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OF THE
UNIVERSITY OF ILLINOIS

Rutgers Scientific School

THE STATE COLLEGE

FOR THE BENEFIT OF

Agriculture and the Mechanic Arts

NEW BRUNSWICK, N. J.

For the Fiscal Year Ending October 31, 1904.

TRENTON, N. J.
MacCrellish & Quigley, State Printers, Opposite Post Office.

1904

THE WAY TO RUTGERS COLLEGE.

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1904

BOARD OF VISITORS

(Appointed by the Governor)

	Residences	*Terms Expire*
FIRST CONGRESSIONAL DISTRICT		
Ephraim T. Gill	Haddonfield	1905
John F. Driver	Mullica Hill	1905
SECOND CONGRESSIONAL DISTRICT		
H. L. Sabsovich	Woodbine	1905
John E. Darnell	Masonville	1905
THIRD CONGRESSIONAL DISTRICT		
David D. Denise	Freehold	1905
James Neilson	New Brunswick	1905
FOURTH CONGRESSIONAL DISTRICT		
Samuel B. Ketcham	Pennington	1905
Peter V. D. Van Doren	Millstone	1905
FIFTH CONGRESSIONAL DISTRICT		
Ogden Woodruff	Elizabeth	1905
Melvin S. Condit	Boonton	1905
SIXTH CONGRESSIONAL DISTRICT		
Abram C. Holdrum	Westwood	1905
William H. Belcher	Paterson	1905
SEVENTH CONGRESSIONAL DISTRICT		
George E. De Camp	Roseland	1905
Cyrus B. Crane	Caldwell	1905
EIGHTH CONGRESSIONAL DISTRICT		
George Dorer	East Orange	1905
Joseph B. Ward, M.D.	Lyons Farms	1905
NINTH CONGRESSIONAL DISTRICT		
Philip M. Brett	Jersey City	1905
John Hudson	Jersey City	1905
TENTH CONGRESSIONAL DISTRICT		
Henry Bell	Union Hill	1905
Henry A. Gaede	Hoboken	1905

OFFICERS

DAVID D. DENISE, *President*
SAMUEL B. KETCHAM, *Vice-President*
IRVING S. UPSON, *Secretary and Treasurer*

Report of the State Board of Visitors

Report of the State Board of Visitors

To His Excellency Franklin Murphy, Governor of the State of New Jersey:

Honored Sir—The Board of Visitors to the State Agricultural College herewith present their fortieth annual report upon the present condition and courses of instruction at that institution, as required by the act creating the Board, entitled "An act appropriating scrip for the public lands granted to the State of New Jersey by the act of Congress, approved July second, one thousand eight hundred and sixty-two," and approved 4th April, 1864.

The members of the Board made their semi-annual examinations of the students pursuing the regular courses of instruction, for the present fiscal year, on 8th December, 1903, and 15th June, 1904. They also visited the laboratories, the draughting-room, the military drill-hall, the collections of the institution, and the farm provided for the State Agricultural College by the Trustees of Rutgers College.

The membership of the Faculty of the College is 33, and all but 3 of this number have given instruction in the Scientific School.

The enrollment of students was 167—graduate students, 5; Seniors, 33; Juniors, 27; Sophomores, 44; Freshmen, 58. There were also 58 students in the classical courses and 153 pupils in attendance at the Preparatory School. The degree of Bachelor of Science was conferred upon 31 graduates in June, 1904. Of these graduates 3 had pursued the Course in Agriculture, 11 the Course in Civil Engineering and Mechanics, 2 the Course in Chemistry, 8 the Course in Electricity, 3 the Course in Biology and 4 the Course in Clay-working and Ceramics.

The final examinations of the students, in the subjects pur-

sued during the year which closed in June, 1904, were well sustained.

At the close of each of the examinations of the students and the inspection of the buildings and facilities for instruction, the members of the Board met in formal session and reported severally upon the observations and impressions of their semi-annual visits. It was voted unanimously that the Trustees and Faculty of Rutgers College are faithfully and liberally carrying out the provisions of their contract with the State.

CONDITION AND PROGRESS

The Ralph Voorhees Library Building, mentioned in the report of last year, has been completed and furnished, and was ready for general use in September, 1904.

The State Laboratory Building of the New Jersey Agricultural Experiment Station, which affords accommodations for the laboratory and class-room work of the students of the New Jersey State College who are pursuing the Courses in Agriculture, Biology and Chemistry, and which was seriously damaged by fire in 1903, has been fully repaired and offers increased facilities for instruction and study.

The following is a list of the members of the graduating class of 1904, together with the subject of each graduate's thesis:

George Wolfe Bauer, "Modern Road Building."

Fred Le Roy Brown, "Concrete Work in Railroad Construction."

William James Douglass, jr., "The Violets in the Vicinity of New Brunswick, New Jersey."

Gardner Sam Driver, "A Railroad Connecting the Raritan River Railroad with the Pennsylvania Railroad."

Stephen Clifton Garrison, "Rust Diseases in Plants, with Particular Reference to the 'Wheat Rust.'"

Frederick William Gaston, "The Violets of New Jersey."

George Henry Gowen, "The Storage Battery."

Richard Heuser, "A Railroad Connecting the Raritan River Railroad with the Pennsylvania Railroad."

Alfred Ellet Hitchner, "The Application of the Storage Battery in Street Railway Systems."

Harry Jay Howell, "The Storage Battery."

Milton Shortlidge Ley, "The Assouan Dam."

Charles Bernard Lipman, "The Effect of the Presence or Absence of Nitrogen in Solution Upon Some Polymorphic Green Algae."

John Mellor, "A Railroad Connecting the Raritan River Railroad with the Pennsylvania Railroad."

Ridgway Fell Moon, "The Steam Turbine and Its Application to Electrical Generators, with Special Reference to the De Laval Type."

Herbert Wills Moore, "The Substitution of Calcium Phosphate for Calcium Carbonate in Glazes."

Frank Abram Morris, "Leguminous Plants."

George Andrew Mount, "A Treatise on Road-making."

John Irving Nelson, "Study of the Adaptations of Plants for the Dispersal of Fruits and Seeds."

Charles Francis O'Neill, "The Rotary Converter."

Harold Blackman Osborn, "The Limits of Raw Lead Glazes as Applied to a Plastic Body."

Herman Arthur Plusch, "Crystalline Glazes."

Frederic Alton Price, jr., "Harbor-dredging."

Warner Risley, "The Engineer's Services in Reclaiming Land by Means of Hydraulic Pumps."

Bertram Frothingham Shivler, "The Quantitative Separation of Calcium and Magnesium."

Whitelaw Reid Stryker, "The Quantitative Separation of Calcium and Magnesium."

Thomas Earle Van Winkle, "The Storage Battery."

Frederick George Carl Volkert, "The Storage Battery."

Charles Wagner, "The Extermination of Mosquitoes in New Jersey as a Problem in Civil Engineering."

Fritz Carl Wittig, "A Comparison of the Use of Magnesium Carbonate for Calcium Carbonate in Porcelain Glazes."

Frank Carrington Woodruff, "The Rotary Converter."

Lewis Maxwell Young, "The Construction of Public Roads."

Appointees to State Scholarships Under Act of 1864

Counties	*Number of Scholarships*	*Appointees*
Atlantic,	1	George O. Smalley, '06, resident of Somerset
Bergen,	1	Edwin L. Baier, '08, resident of Middlesex
Burlington,	3	Thomas L. Wilkinson, '06, resident of Burlington
		Charles Elliot, '08, resident of Union
Camden,	2	Harry J. Stockum, '07, resident of Camden
		Ralph P. Davies, '08, resident of Middlesex
Cape May,	1	Nathan Kaufman, '08, resident of Union
Cumberland,	1	Nelson S. Moore, '06, resident of Cumberland
Essex,	6	Robert W. Cobb, '05, resident of Essex
		R. Lester Beach, '07, resident of Essex
		Howard S. Gies, '07, resident of Essex
		Frank R. Van Sant, '07, resident of Essex
		Otto Reiner, '08, resident of Essex

Counties	*Number of Scholarships*	*Appointees*
Gloucester,	1	Elmer S. Weaver, '05, resident of Gloucester
Hudson,	6	Frank B. Kurtz, '05, resident of Hudson
		Thomas D. Halliwell, jr., '07, resident of Hudson
		Hervey S. De Groodt, '08, resident of Hudson
		Christian Heidt, jr., '08, resident of Hudson
		Clarence L. Pfersch, '08, resident of Hudson
		Edson J. Davis, '05, resident of Middlesex
Hunterdon,	1	Albert R. Johnson, jr., '07, resident of Hunterdon
Mercer,	2	Louis F. B. Woolston, '06, resident of Mercer
		Arthur C. Swift, '08, resident of Monmouth
Middlesex,	2	Irving R. Valentine, '05, resident of Middlesex
		Clarence G. Rolfe, '06, resident of Middlesex
Monmouth,	2	G. Bergen Ford, '05, resident of Monmouth
		Joseph W. Messler, '08, resident of Monmouth
Morris,	2	Adolph Brögger, '06, resident of Middlesex
Ocean,	1	John W. Moffett, '08, resident of Middlesex
Passaic,	2	George R. Koehler, '05, resident of Somerset
Salem,	1	
Somerset,	1	William S. Woodruff, '07, resident of Somerset
Sussex,	1	
Union,	2	Hervey K. Doane, '06, resident of Union
		James E. Morrow, '06, resident of Union
Warren,	1	David T. Mason, '05, resident of Somerset

Appointees to Additional Scholarships Established by Trustees

Frederick R. Mason, '05, resident of Somerset
Albert B. Smith, '05, resident of Somerset
Thomas A. Devan, '06, resident of Middlesex
Percy E. Brown, '06, resident of Middlesex
Winton H. Wilber, '06, resident of Union
John J. Mulligan, '06, resident of Middlesex
Alan C. Plume, '07, resident of Union
Reuben Tharp, jr., '07, resident of Union
Clarence A. Bingham, '08, resident of Union
Morris J. Glück, '08, resident of Middlesex

Appointees to Assembly District Scholarships Under Act of 1890

Harry B. Angus, '05, Essex County Assembly District 1
Welcome W. Bender, '05, Union County Assembly District 1
John Gaub, '05, Middlesex County Assembly District 2
Harry L. Harris, '05, Middlesex County Assembly District 1
Elmer J. Pearce, '05, Union County Assembly District 3
Loren P. Plummer, jr., '05, Salem County Assembly District
William B. Roll, '05, Mercer County Assembly District 2

Eugene W. Seng, '05, Middlesex County Assembly District 3
Benjamin A. Sickles, '05, Monmouth County Assembly District 2
Clarence L. Smith, '05, Mercer County Assembly District 3
Edward H. Acton, '06, Salem County Assembly District
Adolph G. Ahrens, '06, Union County Assembly District 1
Raymond W. Allen, '06, Burlington County Assembly District 2
George G. Ashwell, '06, Essex County Assembly District 10
Thomas H. Bruce, '06, Monmouth County Assembly District 3
Charles R. Duncan, '06, Essex County Assembly District 2
J. Langford Edwards, '06, Ocean County Assembly District
Charles J. Eldridge, '06, Gloucester County Assembly District
Harold H. Febrey, '06, Essex County Assembly District 3
Howard S. Gay, '06, Hudson County Assembly District 1
Arthur V. Gregory, '06, Hudson County Assembly District 2
Arthur W. Hill, '06, Union County Assembly District 3
Roy C. Imlay, '06, Monmouth County Assembly District 1
David W. Jenkins, '06, Morris Count Assembly District 1
George H. Roeder, '06, Middlesex County Assembly District 3
Charles C. Armstrong, '07, Middlesex County Assembly District 3
John L. Baker, '07, Burlington County Assembly District 1
Harlan Besson, '07, Hudson County Assembly District 10
Abraham Blum, '07, Essex County Assembly District 1
Randolph Creamer, '07, Cape May County Assembly District
Lewis A. Heath, '07, Essex County Assembly District 2
William R. Hughes, jr., '07., Middlesex County Assembly District 2
Harris A. Jemison, '07, Monmouth County Assembly District 3
Edward L. Keenan, '07, Somerset County Assembly District
Harry A. Marmer, '07, Hudson County Assembly District 1
Clifford D. Mayhew, '07, Salem County Assembly District
Walter E. Nelson, '07, Middlesex County Assembly District 1
Alex W. Quackenboss, '07, Essex County Assembly District 3
Harvey C. Robins, '07, Essex County Assembly District 4
Walter F. L. Roeder, '07, Essex County Assembly District 5
Isaac V. Slifestein, '07, Hudson County Assembly District 2
James H. Smith, '07, Essex County Assembly District 6
Frank S. Stimson, '07, Union County Assembly District 2
Vinton D. Tompkins, '07, Mercer County Assembly District 3
Russell E. Watson, '07, Middlesex County Assembly District 1
Raymond P. Wilson, '07, Essex County Assembly District 8
Walter H. Wilson, '07, Essex County Assembly District 9
Robert G. Allen, '08, Monmouth County Assembly District 2
Thomas S. Benstead, '08, Hudson County Assembly District 5
Will W. Berdan, '08, Passaic County Assembly District 2
Henry Blanchard, '08, Sussex County Assembly District
Harry F. Brewer, '08, Union County Assembly District 1
Eugene S. Brokaw, '08, Essex County Assembly District 6
Charles B. Carman, '08, Essex County Assembly District 7
Warren L. DuBois, '08, Essex County Assembly District 5
Harry S. Feller, '08, Middlesex County Assembly District 1

Raymond M. Gardner, '08, Essex County Assembly District 1
James Grieve, '08, Camden County Assembly District 1
Morgan Hand, jr., '08, Essex County Assembly District 2
Elmer W. Kent, '08, Middlesex County Assembly District 3
Harry Levenson, '08, Essex County Assembly District 4
Robert A. Lufburrow, '08, Monmouth County Assembly District 3
Alfred J. Mahnken, '08, Hudson County Assembly District 6
Clifford L. Mason, '08, Mercer County Assembly District 1
Richard C. Rice, '08, Camden County Assembly District 2
Schuyler L. Rust, '08, Camden County Assembly District 3
William P. Seddon, '08, Passaic County Assembly District 1
Harold R. Segoine, '08, Monmouth County Assembly District 2
Martin Steelman, '08, Cape May County Assembly District
Rudolph F. Steinke, '08, Union County Assembly District 2
William Teitelbaum, '08, Hudson County Assembly District 4
Horace E. Treat, '08, Monmouth County Assembly District 1
Abraham Urevitz, '08, Hudson County Assembly District 7
Rodney Van Gilder, '08, Essex County Assembly District 3
Charles M. Warner, '08, Union County Assembly District 1
Lloyd R. Wilson, '08, Middlesex County Assembly District 2
Theodore Wyman, jr., '08, Somerset County Assembly District

All of which is respectfully submitted,

D. D. DENISE
President of Board of Visitors

Campus Front View Rutgers

Report of the Board of Trustees

Trustees' Report

RUTGERS COLLEGE
NEW BRUNSWICK, November 30, 1904

To His Excellency Franklin Murphy, Governor of the State of New Jersey:

HONORED SIR—In compliance with the act of Congress, approved 2d July, 1862, and the act of the Legislature of New Jersey, approved 4th April, 1864, I beg leave to submit, on behalf of the Trustees of Rutgers College, the fortieth annual report of Rutgers Scientific School.

1 FACULTY

Austin Scott, Ph.D., LL.D., President, and Professor of History and Political Science.

Francis Cuyler Van Dyck, Ph.D., Professor of Physics and Experimental Mechanics; Dean.

Edward Albert Bowser, C.E., LL.D., Emeritus Professor of Mathematics and Engineering.

Rev. Charles Edward Hart, D.D., Professor of Ethics and Evidences of Christianity.

Louis Bevier, jr., Ph.D., Professor of the Greek Language and Literature.

Alfred Alexander Titsworth, M.Sc., C.E., Professor of Civil Engineering and Graphics.

Julius Nelson, Ph.D., Professor of Biology.

Byron David Halsted, S.D., Professor of Botany and Horticulture.

John Bernard Smith, D.Sc., Professor of Entomology.

Edward Burnett Voorhees, D.Sc., Professor of Agriculture; Director of the Agricultural College Experiment Station; Superintendent of the College Farm.

John Charles Van Dyke, L.H.D., Professor of the History of Art.

Robert Woodworth Prentiss, M.Sc., Professor of Mathematics and Astronomy; Director of the Schanck Observatory.

Eliot Robertson Payson, Ph.D., Professor of the History and Art of Teaching.

Edward Luther Stevenson. Ph.D., Professor of History.

Rev. Henry Du Bois Mulford, D.D., Professor of the English Language and Literature and Rutgers College Lecturer on the English Bible.
William Hamilton Kirk, Ph.D., Professor of the Latin Language and Literature.
Samuel Ewing Smiley, LL.B., Captain Fifteenth U. S. Infantry, Professor of Military Science and Tactics.
Joseph Volney Lewis, S.B., Professor of Geology and Mineralogy.
Edwin Bell Davis, B.L., Professor of Romance Languages.
Irving Strong Upson, A.M., Librarian and Registrar; Secretary of the Faculty.
Clarence Livingston Speyers, Ph.B., Associate Professor of Chemistry.
William Eugene Breazeale, M.Sc., Acting Associate Professor of Mathematics.
Edward Livingston Barbour, M.E., Instructor in Rhetoric and Elocution.
Fred Herbert Dodge, A.B., Instructor in Physical Training; Director of the Gymnasium.
Richard Morris, M.Sc., Instructor in Mathematics and Graphics.
Cullen Warner Parmelee, B.Sc., Instructor in Chemistry; Director of the Department of Clay-working and Ceramics.
Albert Chester de Regt, M.Sc., Instructor in Chemistry.
Arthur Hereford Wykeham George, A.B., Instructor in Mathematics.
Eugene Howard Babbitt, A.B., Instructor in German.
Frank Forrester Thompson, E.E., Instructor in Electrical Science.

Jacob Goodale Lipman, Ph.D., Assistant in Agricultural Chemistry.
George Winfield Nuttman, M.Sc., Assistant in Biology.

The names of the Faculty, after that of the President, are arranged in groups. The professors, according to seniority of appointment; the Librarian and Registrar; the associate professors and instructors, in the order of their respective appointments.

OTHER OFFICERS

John Edward Elmendorf, A.M., Assistant to the Treasurer.
George Augustus Osborn, B.Sc., Assistant in the Library.
William Seymour Valiant, Assistant in the Geological Museum.

Clarence A. Du Bois
John Thomas
Cheeseman Fisher
Francis R. Cox
} Janitors

2 STUDENTS

GRADUATE STUDENTS

Names	Residences	Rooms
Edgar Leek Dickerson, B.Sc. Rutgers Scientific School, 1902 *Entomology, Botany, Chemistry*	Newark	Bleecker Place
George Winfield Nuttman, M.Sc. Rutgers Scientific School, 1896 *Animal Morphology, Botany, Entomology*	New Brunswick	35 Mine St.

SENIOR CLASS

CLASS OF 1905

Names	Residences	Rooms
Harry Baremore Angus	Elizabeth	Chi Phi House
Welcome William Bender	Elizabeth	Elizabeth
Charles William Chappel	Warsaw, N. Y.	27 Hertzog Hall
Robert Weeks Cobb	Newark	Zeta Psi House
Edson Joseph Davis	New Market	16 Hertzog Hall
Arthur Voorhees De Hart	Raritan	Delta Upsilon House
George Bergen Ford	Allentown	D. K. E. House
John Gaub	New Brunswick	134 Easton Ave.
Harry Lloyd Harris	New Brunswick	359 George St.
Franklyn Edward Holsten	Brooklyn, N. Y.	D. K. E. House
George Richard Koehler	Somerville	Delta Upsilon House
Francis Bodo Kurtz	Jersey City	5 Union St.
David Townsend Mason	Bound Brook	Chi Psi Lodge
Frederick Ramsay Mason	Bound Brook	Chi Psi Lodge
Charles Arthur Morris	Hightstown	Delta Upsilon House
John Elmer Pearce	Linden	Chi Phi House
Loren Pease Plummer, jr.	Quinton	Chi Phi House
Dale Charles Roberts	Basom, N. Y.	Gymnasium
William Booth Roll	Trenton	137 Winants Hall
Eugene William Seng	New Brunswick	50 Easton Ave.
Benjamin Augustus Sickles	Colts Neck	163 College Ave.
Albert Brokaw Smith	Somerville	Beta Theta Pi House
Clarence Lockerson Smith	Trenton	Chi Phi House
Irving Russell Valentine	Woodbridge	Zeta Psi House
Elmer Spangler Weaver	Williamstown	D. K. E. House

JUNIOR CLASS

CLASS OF 1906

Names	Residences	Rooms
Edward Harker Acton	Salem	124 Winants Hall
Adolph Geroasius Ahrens	Elizabeth	Elizabeth
Raymond Walter Allen	Medford	Chi Phi House
George Gouverneur Ashwell	New Brunswick	24 College Ave.
William Harris Benedict, jr.	New Brunswick	86 Carroll Place
Clifford Stanislaus Brinkerhoff	Brooklyn, N. Y.	Delta Phi House
Adolph Brögger	Perth Amboy	102 Winants Hall
Percy Edgar Brown	Woodbridge	Woodbridge
Thomas Harvey Bruce	Oceanic	221 Seaman St.
*Nathan Campbell	Haledon	Haledon
Charles Henry Connors	New Brunswick	255 Baldwin St.
David Alexander Decker	Pine Bush, N. Y.	134 Winants Hall
Thomas Alan Devan	New Brunswick	131 Somerset St.
Hervey Kinch Doane	Plainfield	130 Winants Hall
Charles Robert Duncan	Newark	Newark
Job Langford Edwards	Barnegat	130 Winants Hall
Charles Job Eldridge	Williamstown	134 Winants Hall
Henry Marshall Fales, jr.	Buffalo, N. Y.	11 Union St.
Harold Hooley Febrey	Elizabeth	109 Winants Hall
Howard Spooner Gay	Bayonne	Delta Phi House
Arthur Vaughan Gregory	Rahway	136 Winants Hall
Albert William Hill	Linden	Chi Phi House
Arthur Headifen Howatt	New Brunswick	Beta Theta Pi House
Roy Gordon Imlay	Farmingdale	10 Hertzog Hall
David William Jenkins	Mine Hill	47 Hertzog Hall
Frank Otto Mittag, jr.	Park Ridge	Delta Upsilon House
Nelson Sheppard Moore	Bridgeton	130 Winants Hall
James Edwin Morrow	Summit	Delta Upsilon House
John Joseph Mulligan	Perth Amboy	102 Winants Hall
Frank Randall Pratt	Warsaw, N. Y.	16 Hertzog Hall
George Henry Roeder	New Brunswick	Highland Park
Clarence Gordon Rolfe	New Brunswick	101 Bayard St.
Nahum David Shore	Boston, Mass.	College Farm
George Oakley Smalley	Bound Brook	Chi Psi Lodge
Frederick Newton Wardwell	Brooklyn, N. Y.	D. K. E. House
Winton Hadley Wilber	Cranford	Zeta Psi House
Thomas Lambert Wilkinson	Riverside	108 Winants Hall
Louis Frederick Baker Woolston	Trenton	Trenton

* Absent with leave

SOPHOMORE CLASS

CLASS OF 1907

Names	Residences	Rooms
Charles Chambers Armstrong	South River	South River
John Louis Baker	Trenton	D. K. E. House
Ralph Lester Beach	East Orange	27 Hertzog Hall
Harlan Besson	Hoboken	Delta Upsilon House
Abraham Blum	New Brunswick	20 Church St.
*Walter Rodney Cornell	Vineland	Vineland
Randolph Creamer	Petersburg	45 Hertzog Hall
Lawrence Esselstyn	Claverack, N. Y.	20 Hertzog Hall
Charles Burhans Finch	Kingston, N. Y.	Chi Psi Lodge
Howard Somerville Gies	Newark	35 Hertzog Hall
J. M. Gonzalez	San Juan, P. R.	Beta Theta Pi House
Thomas Dean Halliwell, jr.	Jersey City	Zeta Psi House
Lewis Arthur Heath	New Brunswick	342 George St.
Max Hemmer, jr.	Newark	D. K. E. House
William Richard Hughes, jr.	New Brunswick	282 Redmond St.
Harris Allison Jemison	New Brunswick	College Farm
Albert Rittenhouse Johnson, jr.	Raven Rock	10 Codwise Ave.
Edward Louis Keenan	Somerville	D. K. E. House
Francis Granger Lang	Hornellsville, N. Y.	Chi Psi Lodge
Harry Aaron Marmer	Woodbine	2 High St.
Clifford Davidson Mayhew	Elmer	Chi Phi House
Walter Ernest Nelson	New Market	New Market
Alan Cole Plume	Cranford	Cranford
Alex William Quackenboss	New Brunswick	98 Albany St.
Walter Frank Reinheimer	Warsaw, N. Y.	D. K. E. House
Harvey Clifford Robins	Roselle	Roselle
Walter Frederick Ludwig Roeder	New Brunswick	Highland Park
Isaac Victor Slifestein	Woodbine	2 High St.
James Herbert Smith	New Brunswick	229 George St.
Frank Sanford Stimson	Linden	Linden
Harry John Stockum	Marlton	Delta Upsilon House
Alton P Swan	Brooklyn, N. Y.	12 Winants Hall
Reuben Tharp, jr.	Rahway	Rahway
Vinton Douglas Tompkins	Trenton	12 Winants Hall
Ralph Decker Van Duzer	Middletown, N. Y.	108 Bayard St.
Frank Robertson Van Sant	Newark	D. K. E. House
Theodore Romeyn Varick	New Brunswick	35 College Ave.
Russell Ellsworth Watson	New Brunswick	17 Hardenbergh St.
Howard Irving Wheat	Brooklyn, N. Y.	Beta Theta Pi House
Raymond Percy Wilson	East Millstone	Chi Phi House
Walter Harris Wilson	Metuchen	Metuchen
William Sanderson Woodruff	Somerville	Somerville

* Absent with leave

FRESHMAN CLASS

CLASS OF 1908

Names	Residences	Rooms
Robert Goldsmith Allen	Red Bank	135 Winants Hall
Edwin Lewis Baier	New Brunswick	95 Albany St.
Thomas Stanley Benstead	Arlington	163 College Ave.
Will Wiseman Berdan	Paterson	29 Hertzog Hall
Clarence Arminger Bingham	Elizabeth	Chi Phi House
Cunningston Drysdale Black	Montague	Chi Phi House
Henry Blanchard	Newton	90 Winants Hall
Eugene Suydam Brokaw	Bound Brook	Chi Psi Lodge
Charles Bloomfield Carman	Rahway	Rahway
Frank Taintor Corbin, jr.	Oxford, N. Y.,	Delta Phi House
Hervey Stanton De Groodt	Jersey City	Delta Upsilon House
Warren Livingston Du Bois	Tennent	Tennent
Charles Elliot	Scotch Plains	163 College Ave.
Harry Samuel Feller	New Brunswick	199 Burnet St.
Douglas Judson Fisher	Sayreville	Beta Theta Pi House
Alvin Bartholdi Fox	Perth Amboy	Perth Amboy
Raymond McNair Gardner	Newark	Zeta Psi House
Morris James Glück	Perth Amboy	Perth Amboy
James Grieve	Perth Amboy	61 Winants Hall
Morgan Hand, jr.	Ocean City	Zeta Psi House
Herbert Langley Harries	Washington, D. C.	Delta Phi House
Christian Heidt, jr.	Jersey City	Zeta Psi House
Harold Frederick Hovey	Albany, N. Y.	99 Winants Hall
Nathan Kaufman	Elizabeth	Elizabeth
Elmer Williamson Kent	New Brunswick	225 Townsend St.
Robert Austin Klein	Buffalo, N. Y.	90 Winants Hall
Horatio Seymour Lang, jr.	Hornellsville, N. Y.	Chi Psi Lodge
Harry Levenson	Woodbine	36 Schureman St.
Robert Allen Lufburrow	Atlantic Highlands	113 Winants Hall
Alfred John Mahnken	Union Hill	17 Winants Hall
Clifford Lea Mason	Trenton	Trenton
Benjamin Marshall Miller	Oxford, N. Y.	Chi Psi Lodge
John William Moffett	Fords	Fords
George Washington Mulheron	Trenton	Trenton
Irving Lovejoy Owen	Wyoming, N. Y.	54 Hassart St.
Clarence Louis Pfersch	Hoboken	Hoboken
Otto Reiner	Newark	Newark
Richard Cox Rice	New Brunswick	82 Carroll Place
Schuyler Leonard Rust	New Brunswick	118 New St.
Daniel Safford	Brooklyn, N. Y.	11 Winants Hall
William Personet Seddon	Paterson	29 Hertzog Hall
Harold Richard Segoine	Point Pleasant	113 Winants Hall

Names	Residences	Rooms
Alexander Burton Shufeldt	Kingston, N. Y.	
Morgan Gray Smith	Catskill, N. Y.	43 Hertzog Hall
Martin Somers Steelman	Ocean City	45 Hertzog Hall
Rudolph Frederick Steinke	Elizabeth	Elizabeth
Arthur Cunningham Swift	Shrewsbury	Zeta Psi House
Samuel Royce Taverner	Ballston Spa, N. Y.	D. K. E. House
William Teitelbaum	Hoboken	Hoboken
Horace Edward Treat	Freehold	College Farm
Abraham Urevitz	West Hoboken	46 Dennis St.
Rodney Van Gilder	Petersburg	39 Hertzog Hall
Rafael Serafin Vidal	San Juan, P. R.	148 Somerset St.
Harry Arthur Vosburgh	Warsaw, N. Y.	213 Hamilton St.
Charles Maxwell Warner	Elizabeth	Elizabeth
Clarence Alexander Wilbur	Catskill, N. Y.	39 Hertzog Hall
George Robert Wilson	Poughkeepsie, N. Y.	Delta Upsilon House
Lloyd Richard Wilson	Metuchen	Metuchen
Theodore Wyman, jr.	Somerville	17 Winants Hall

SPECIAL STUDENTS

NOT CANDIDATES FOR A DEGREE

Names	Residences	Rooms
Frank Lofland Cosgrove	Zanesville, O.	81 Easton Ave.
Ralph Price Davies	New Brunswick	151 Somerset St.
Thornton Mills Hopler	Newark	Newark
Edward Benedict Kelley	Elizabeth	Elizabeth
Joseph Watson Messler	Allentown	D. K. E. House
Frank Herman Stobaeus	Newark	62 Winants Hall
Stirling Van Winkle	Rutherford	Beta Theta Pi House

SUMMARY

Graduate Students	2
Seniors, Class of 1905	25
Juniors, Class of 1906	37
Sophomores, Class of 1907	41
Freshmen, Class of 1908	59
Special Students	7
	171
Absent with leave	2

3 ADMISSION

Every applicant for admission should be at least sixteen years of age, and must submit to the President proper testimonials of a good moral character. If an applicant for a free State scholarship he must also present to the President a certificate of appointment.

Students who present themselves should be prepared, by careful study and by reviews of their work, to pass successfully a thorough examination on the subjects which are required; in which event they will be admitted without conditions.

Only such students are admitted with conditions as are, in the opinion of the Faculty, so nearly prepared as to be able to make up all deficiencies during the first term, meanwhile maintaining a good standing in their class.

Conditioned students will have an opportunity given them to remove their entrance conditions as early as possible in the first term. It is expected that entrance conditions will be made up before the beginning of the second term.

Examinations at the School.—Examinations for admission will be held on the Friday and Saturday preceding commencement week, 16th and 17th June, 1905, beginning at 10 o'clock A. M. on Friday, in the Registrar's office. Applicants may also be examined on Monday and Tuesday, 18th and 19th September, 1905, at the same hour and place. Students are advised to be present for examination in June.

Preliminary Examinations.—It is not necessary that examinations in all the subjects required for admission be taken in the same year, but candidates may, on the above dates, offer themselves, at any point in their preparatory studies, for preliminary examinations in any of the subjects required for admission in which their teachers certify that they are prepared.

State Competitive Examinations.—Students will be admitted who pass the State competitive examinations, which will

Queen's College Rutgers

be held in the court-house of each county on Saturday, 3rd June, 1905. For the requirements of the State law, see pages 24, 25.

College Entrance Examination Board.—Rutgers has shared in the movement to secure uniform requirements for admission to the colleges under whose auspices an Examination Board has been organized. Certificates of this Board will be accepted in both the Classical and Scientific Schools of Rutgers.

Certificates.—From certain preparatory schools of approved standing, students are admitted to the Freshman Class upon the certificate of the principal.

Admission by certificate is conditioned upon the student's proving himself able to do the full work of his class, and at any time during the freshman year he may be dropped from the class in case his work is not satisfactory.

Upon the request of the principal, or Board of Education, the Faculty will appoint a committee to visit any school and to report upon its condition.

The schools which shall be approved by the Faculty upon the report of this committee shall be entitled, for a period of three years, to the privilege of admission upon certificate.

Blank forms of certificate for admission will be furnished to the principal of an approved school upon application to the Registrar.

The pass-cards given by the Regents of the University of the State of New York, and the certificates of certain other institutions approved by the Faculty, are accepted in place of entrance examinations in the subjects which they cover.

The certificates, when properly filled out, or the pass-cards, should be forwarded to the Registrar before the day fixed for the examinations for admission in June of each year.

Advanced Standing.—Students may enter advanced classes either at the beginning of the School year or at other times, if they sustain a satisfactory examination, both on the preliminary

studies and on those already passed over by the class which they propose to enter. Full equivalents will be accepted.

Special Students.—In exceptional cases students properly prepared for admission to the Freshman Class may, by special vote of the Faculty, be permitted to pursue select branches of study. Such students are required to take examinations, and all work in composition, elocution, and military drill, with the class with which they are studying.

FREE SCHOLARSHIPS

State Scholarships, Act of 1864.—Under this law, a certain number of students from the State of New Jersey are received into the Scientific School, and educated free of expense for tuition. These students are admitted to free scholarships on the recommendation of the superintendent of schools in each county, after passing the required examinations. The scholarships provided by the act of 1864 are distributed among the counties in proportion to their population, as follows:

Atlantic 1	Gloucester 1	Ocean 1
Bergen 1	Hudson 6	Passaic 2
Burlington 3	Hunterdon 1	Salem 1
Camden 2	Mercer 2	Somerset 1
Cape May 1	Middlesex 2	Sussex 1
Cumberland 1	Monmouth 2	Union 2
Essex 6	Morris 2	Warren 1

Scholarships-at-large.—In June, 1888, the Trustees of Rutgers College provided ten additional free State scholarships.

State Scholarships, Act of 1890.—By a law passed 31st March, 1890, a number of free scholarships, one for each Assembly district for each year, is established and offered to students in all parts of the State. The candidates for these scholarships are selected as follows:

A competitive examination, under the direction of the city superintendents and the county superintendent of education in

each county shall be held at the county court-house in each county of the State, upon the first Saturday in June in each year. If several candidates for appointment pass the examination from the same Assembly district, all who are suitably qualified shall receive appointment to such free scholarships, excess from certain Assembly districts being counterbalanced by vacancies in other Assembly districts, provided only that the entire number of appointees shall not exceed the entire number of free scholarships created by the State.

The following are the names and addresses of the county superintendents:

Atlantic—Samuel D. Hoffman, Atlantic City
Bergen—John Terhune. Hackensack
Burlington—Herman A. Stees, Beverly
Camden—Charles S. Albertson, Magnolia
Cape May—Aaron W. Hand, Cape May City
Cumberland—John N. Glaspell, Bridgeton
Essex—Elmer C. Sherman. South Orange
Gloucester—William H. Eldridge, Williamstown
Hudson—M. H. Kinsley, Hoboken
Hunterdon—Jason S. Hoffman, Flemington
Mercer—A. W. Hartwell, Titusville
Middlesex—H. Brewster Willis, New Brunswick
Monmouth—John Enright, Freehold
Morris—Watson B. Matthews, Dover
Ocean—Peter Tilton, Toms River
Passaic—Homer A. Wilcox, Passaic City
Salem—J. A. Wentzell, Elmer
Somerset—H. C. Krebs, Somerville
Sussex—Ralph Decker, Sussex
Union—William J. Shearer, Elizabeth
Warren—Franklin T. Atwood, Hackettstown

Letters of inquiry to the President, or to the Registrar, will receive careful attention.

REQUIREMENTS FOR ADMISSION

At present the first four of the following are the subjects in which those who wish to enter the Freshman Class of the Scientific School are examined. In June, 1906, the fifth, a language

requirement, goes into force. Since all are such as can be acquired in our best common schools, it is insisted that the preparation in them shall be thorough and complete.

1 Mathematics

ALGEBRA through the first seventeen chapters of Bowser's *College Algebra,* or an equivalent.

The student should be thoroughly drilled in the fundamental operations, factoring, greatest common divisor, least common multiple, fractions, equations of the first degree with one or more unknown quantities, problems which lead to equations of the first degree, involution and evolution of monomials and polynomials, and the square and cube root of numbers; the theory of exponents, radicals, properties of quadratic surds, square root of a binomial surd, solution of equations containing radicals, quadratic equations of one or more unknown quantities, simultaneous quadratic equations, equations of higher degrees than the second which may be reduced to the quadratic form and then solved by the methods of solving quadratics, ratio and proportion, arithmetic, geometric, and harmonic progressions.

The student should form the habit of arranging his work, whether on the blackboard or on paper, in a neat and orderly manner. Special stress is laid upon the speed and accuracy of his work.

GEOMETRY.—The whole of plane and solid geometry is required, as contained in Bowser's, or an equivalent. Careful attention should be given to the "Exercises in Geometry," since much importance is attached to the student's ability to demonstrate original exercises.

2 English

ENGLISH GRAMMAR—including spelling.

In June and September, 1905, the examination will be based on the following books:

A. Prescribed for careful reading:
Shakspere's The Merchant of Venice
Shakspere's Julius Cæsar

Addison's Sir Roger de Coverley Papers in *The Spectator*
Goldsmith's The Vicar of Wakefield
Coleridge's The Rime of the Ancient Mariner
Scott's Ivanhoe
Carlyle's Essay on Burns
Tennyson's The Princess
Lowell's The Vision of Sir Launfal
George Eliot's Silas Marner

B. Prescribed for study and practice:
Shakspere's Macbeth
Milton's Lycidas, Comus, L'Allegro and Il Penseroso
Burke's Speech on Conciliation with America
Macaulay's Essays on Milton and Addison

In June and September, 1906, 1907, and 1908, the examination will be based upon the following books:

A. Prescribed for careful reading:
Coleridge's The Rime of the Ancient Mariner
George Eliot's Silas Marner
Irving's Life of Goldsmith
Lowell's The Vision of Sir Launfal
Scott's Ivanhoe
Scott's The Lady of the Lake
Shakspere's Macbeth
Shakspere's The Merchant of Venice
Addison's Sir Roger de Coverley Papers in *The Spectator*
Tennyson's Gareth and Lynette, Launcelot and Elaine, and The Passing of Arthur.

B. Prescribed for study and practice:
Burke's Speech on Conciliation with America
Macaulay's Essay on Addison
Macaulay's Life of Johnson
Milton's Lycidas, Comus, L'Allegro, and Il Penseroso
Shakspere's Julius Cæsar

A short essay is required, to be written at the examination, on some theme connected with one or more of the books in the first list, A. No student will be accepted in English whose paper is notably deficient in spelling, punctuation, division into paragraphs, and expression, and whose answers show that he has not been instructed in the definitions and rules of grammar, and in parsing.

3 History of the United States

Candidates for admission are examined in the history of the United States, with special reference to the colonization of the several States, the forms of government which existed previous

to the War for Independence, the causes and principal events of that war, the period of the Confederation, the establishment of the Federal Constitution, with the general history subsequent to that event.

Students often lack thorough or recent preparation in this subject. A more accurate knowledge of American history has become necessary as preliminary to the systematic instruction now given on the duties and relations of American citizenship. Students must have reviewed the subject within the two years immediately preceding their application for admission.

4 Science

PHYSICS.—Students are required to show satisfactory acquaintance with Wells' or Cooley's *Natural Philosophy,* or Peck's *Ganot's Physics.*

CHEMISTRY.—Such knowledge of chemistry is required as may be obtained from a thorough study of Remsen's, Cooley's or Stelle's *Chemistry* complete.

5 New Language Requirement

LATIN, GERMAN, FRENCH

Beginning with June, 1906, the candidates for admission will be examined in two of these languages, in one of which he must meet both requirements, *a* and *b,* and in the other, the elementary requirement, *a,* the choice of languages being left entirely with the candidate.

The elementary requirement, *a,* presupposes one year's work (five periods weekly); the advanced, *b,* presupposes one additional year of study (five periods weekly).

LATIN.—*a.* This should include drill in inflections and the elements of syntax, translation of simple sentences from English into Latin, and in addition to more elementary matter, the reading of from twenty to thirty pages of a consecutive Latin text.

b. This should include further drill in syntax, illustrated by translation from English into Latin, and the reading of a Latin text, or texts, equal in amount to the first four books of Cæsar's *Gallic War.*

GERMAN.—*a*. This should include a careful drill on pronunciation, colloquial exercises, the rudiments of the grammar, particularly inflection, embracing the more usual strong (or irregular) verbs, translation from English into German and the reading of 75 to 100 pages of graduated text.

b. This should include a careful drill on all the main points of grammar, sufficient practice to enable the student to translate familiar colloquial English into German, and to translate at sight ordinary German prose. From 150 to 200 pages of literature of medium difficulty should have been read in class in addition to requirement *a*.

FRENCH.—*a*. This should correspond in character to German *a* (from 100 to 175 pages of reading).

b. This should correspond in character to German *b* (from 250 to 400 pages of reading in addition to requirement *a*).

4 COURSES OF STUDY

The complete course occupies four years, each year consisting of three terms.

During the first year the studies are the same, and are designed to furnish a suitable introduction to the pursuit of the higher branches in the special courses.

The elements of agriculture, of biology, and of botany are taught during the first, second and third terms, respectively. Mathematics, draughting, English and French are taught throughout the year.

At the end of the first year, students elect to pursue one of the special courses, and for the remaining three years their studies are directed with particular reference to the choice made. Some studies which go to the equipment of the intelligent citizen, whatever his occupation, such as history, English literature, political economy, practical ethics, astronomy and others, are interspersed throughout the entire four years, in order that the students may not only acquire a thorough preparation for their special pursuits in life, but may at the same time receive a liberal training which will fit them to dicharge wisely and usefully the duties of good citizenship.

Six distinct courses of study are included in the schedule:

1 A COURSE IN AGRICULTURE
2 A COURSE IN CIVIL ENGINEERING AND MECHANICS
3 A COURSE IN CHEMISTRY
4 A COURSE IN ELECTRICITY
5 A COURSE IN BIOLOGY
6 A COURSE IN CLAY-WORKING AND CERAMICS

In addition to the regular course in Clay-working and Ceramics there is also a short course of two years, which does not lead to a degree; see page 42.

All students except those belonging to the first class (see page 63) in the two-year course, are required to take exercises in English throughout the entire course, as follows: essays, two each term; forensics, four times each term (declamations and extempore speaking during the freshman and sophomore years and orations and extempore speaking during the junior and senior years).

Military drill is required of all students in the Scientific School twice each week throughout the entire course.

Laboratory of the New Jersey State Agricultural Experiment Station.

PRESCRIBED STUDIES

Freshman Class

Uniform Schedule for all Scientific Courses

FIRST TERM, Thirteen Weeks

	Hours a week
1 French.—Grammar; reader	5
2 Mathematics.—Bowser's *Algebra,* completed	5
3 Principles of Agriculture.—Voorhees	2
4 Rhetoric.—Hill's *Principles;* lectures; essays	2
5 Civics	1
6 Draughting.—Practice in use of instruments; geometrical problems and applications	4

SECOND TERM, Thirteen Weeks

1 French.—Selections in prose and verse	5
2 Mathematics.—Bowser's *Trigonometry,* plane and spherical	5
3 Zoölogy.—Jordan, Kellogg and Heath's *Animal Studies*	2
4 English Literature.—Pancoast's *Introduction to English Literature*	4
5 Draughting.—Projections	4

THIRD TERM, Ten Weeks

1 French.—Modern texts	5
2 Mathematics.—Surveying, Carhart	5
3 Botany.—Gray's *Revised Lessons*	2
4 English Literature.—Pancoast's *Introduction to English Literature*	4
5 Draughting.—Free-hand drawing and perspective	4

Sophomore Class

First Term

1 Inorganic Chemistry.—Lectures, with experiments	4
2 Physics.—Ganot; lectures	3
3 German.—Bierwirth's *Elements of German;* simple prose	3

Second Term

1 Inorganic Chemistry.—Lectures, with experiments	3
2 Physics.—Ganot; lectures	3
3 German.—Modern prose; sight-reading; composition	4

Third Term

	Hours a week
1 Organic Chemistry.—Lectures, with experiments	3
2 Physics.—Ganot; lectures	3
3 German.—Prose-reading	4

Junior Class

First Term

1 Astronomy	3
2 Mental Philosophy.—James's *Psychology, Briefer Course*	2
3 History.—Robinson; Emerton; Bryce; lectures; class reports	3

Second Term

1 Mineralogy.—Moses and Parsons	2
2 Logic	2
3 History.—Robinson; Emerton; Bryce; lectures; class reports	3
4 Physics.—Steam engine and other prime motors	2
5 Military Science	1

Third Term

1 United States History	5
2 Military Science	2

Senior Class

First Term

1 Political Economy.—Walker and Perry; lectures	4
2 Geology.—Brigham	2

Second Term

1 Constitutional Law.—Cooley; lectures	4
2 Geology.—Brigham	2
3 Military Science	1

Third Term

1 International Law.—Lectures	4
2 Practical Ethics.—MacKenzie's *Ethics*	2
3 Thesis	..

ELECTIVE COURSES

1 COURSE IN AGRICULTURE

Sophomore Year

First Term

	Hours a week
1 Experimental Chemistry.—Chemical experiments (first two months of term)	2
2 Blowpipe Analysis.—Lectures (last month of term)	2
3 Chemical Laboratory Practice.—Experimental chemistry and blowpipe analysis	11

Second Term

1 Qualitative Analysis.—Fresenius; lectures	2
2 Chemical Laboratory Practice.—Qualitative analysis	11

Third Term

1 Qualitative Analysis.—Fresenius; lectures	2
2 Chemical Laboratory Practice.—Qualitative analysis	11

Junior Year

First Term

1 Agriculture.—Agricultural chemistry; lectures	2
2 General Biology.—Parker's *Lessons*	3
3 Chemical Laboratory Practice	4
4 Biological Laboratory Practice	4

Second Term

1 Agriculture.—Soils and crops	2
2 Anatomy of Invertebrates	2
3 Vegetable Histology	1
4 Zoölogical Laboratory Practice	4
5 Botanical Laboratory Practice	4

Third Term

1 Vegetable Histology	4
2 Anatomy and Physiology of Insects	4
3 Botanical Laboratory Practice	4
4 Entomological Laboratory Practice	2

Senior Year

First Term

	Hours a week
1 Agriculture.—Manures and manuring	4
2 Systematic Entomology	3
3 Anatomy and Histology of Vertebrates	2
4 Zoölogical Laboratory Practice	4
5 Entomological Laboratory Practice	2

Second Term

1 Agriculture.—Animal nutrition	4
2 Embryology and Mammalian Anatomy	3
3 Vegetable Physiology	2
4 Zoölogical Laboratory Practice	4
5 Botanical Laboratory Practice	4

Third Term

1 Agriculture.—Breeds and breeding	3
2 Economic Entomology	4
3 Vegetable Pathology	2
4 Botanical Laboratory Practice	4
5 Entomological Laboratory Practice	2

2 COURSE IN CIVIL ENGINEERING AND MECHANICS

Sophomore Year

First Term

1 Descriptive Geometry.—Hall	5
2 Draughting.—Projections; lettering	4

Second Term

1 Analytic Geometry.—Bowser	5
2 Draughting.—Projections; intersections and development of surfaces, etc.	4

Third Term

1 Analytic Geometry.—Bowser, completed	5
2 Draughting.—Shades and shadows; linear perspective, etc.	4

Junior Year

First Term

	Hours a week
1 Differential Calculus.—Bowser	5
2 Draughting.—Lettering	4

Second Term

1 Calculus.—Differential calculus, completed; integral calculus, Bowser	5
2 Draughting.—Plain and colored topography; machine construction; india ink and color shading, etc.	5

Third Term

1 Integral Calculus, Completed.—Bowser	4
2 Railroad Curves.—Carhart's *Field Book*	3
3 Draughting.—Copying, tracing, blue print copying, railroad profiles and cross sections; field work	4

Senior Year

First Term

1 Mechanics.—Bowser	5
2 Roofs and Bridges.—Bowser	4
3 Draughting.—Graphical statics, with applications	4

Second Term

1 Mechanics, Completed.—Bowser	5
2 Roofs and Bridges, Completed; Hydromechanics.—Bowser	4
3 Draughting.—Graphical statics, with applications	4

Third Term

1 Hydromechanics, Completed.—Bowser	5
2 Geodesy.—Lectures	4

3 COURSE IN CHEMISTRY

Sophomore Year

First Term

	Hours a week
1 Experimental Chemistry.—Chemical experiments (first two months of term)	2
2 Blowpipe Analysis.—Lectures (last month of term)	2
3 Mathematics	3
4 Chemical Laboratory Practice.—Experimental chemistry and blowpipe analysis	8

Second Term

1 Qualitative Analysis.—Fresenius; lectures	2
2 Mathematics	3
3 Chemical Laboratory Practice.—Qualitative analysis	8

Third Term

1 Qualitative Analysis.—Fresenius; lectures	2
2 Mathematics	3
3 Chemical Laboratory Practice.—Qualitative analysis	8

Junior Year

First Term

1 Quantitative Analysis.—Fresenius; Cairns; recitations	2
2 Organic Chemistry.—Remsen	3
3 Chemical Laboratory Practice.—Quantitative analysis	8

Second Term

1 Organic Chemistry.—Remsen	4
2 Crystallography	1
3 Chemical Laboratory Practice.—Quantitative analysis	8

Third Term

1 Stoichiometry	3
2 Determinative Mineralogy	5
3 Chemical Laboratory Practice.—Quantitative analysis	8

Senior Year

First Term

	Hours a week
1 Applied Chemistry.—Thorp; Blount and Bloxam; lectures; visits to manufactories	3
2 Principles and Theories of Chemistry, with Laboratory Practice	5
3 Reports.—Recent chemical literature	1
4 Chemical Laboratory Practice.—Quantitative analysis,	8

Second Term

1 Applied Chemistry.—Thorp; Blount and Bloxam; lectures; visits to manufactories	4
2 Principles and Theories of Chemistry, with Laboratory Practice	4
3 Reports.—Recent chemical literature	1
4 Chemical Laboratory Practice.—Organic chemistry	8

Third Term

1 Applied Chemistry.—Sadtler; lectures; visits to manufactories	3
2 Principles and Theories of Chemistry, with Laboratory Practice	5
3 Reports.—Recent chemical literature	1
4 Chemical Laboratory Practice.—Organic chemistry	8

4 COURSE IN ELECTRICITY

Sophomore Year

First Term

1 Descriptive Geometry.—Hall	5
2 Draughting.—Projections; lettering	4

Second Term

1 Analytic Geometry.—Bowser	5
2 Draughting.—Projections; intersections and development of surfaces, etc.	4

Third Term

1 Analytic Geometry, Completed.—Bowser	5
2 Draughting.—Shades and shadows; linear perspective, etc.	4

Junior Year

First Term

	Hours a week
1 Differential Calculus.—Bowser	5
2 Draughting.—Lettering; machine construction	4
3 Laboratory.—Physical measurements	2

Second Term

1 Calculus.—Differential calculus, completed; integral calculus, Bowser	5
2 Draughting.—India ink and color shading, etc.	4
3 Laboratory.—Mechanics; measurement of power	2

Third Term

1 Integral Calculus, Completed.—Bowser	5
2 Physical Problems	3
3 Draughting.—Construction, copying, tracing, blue-print copying	4
4 Chemistry.—Qualitative analysis	4

Senior Year

First Term

1 Mechanics.—Bowser	5
2 Elementary and Practical Electricity and Magnetism	4
3 Draughting.—Machine-design	4
4 Laboratory.—Electrical measurement	2

Second Term

1 Mechanics, Completed.—Bowser	5
2 Dynamo-Electric Machinery	4
3 Draughting.—Machine construction as applied to electricity	4
4 Laboratory.—Electrical testing; dynamo machines	2

Third Term

1 Mathematical Theory of Electricity	5
2 Theory of Alternating Currents	4
3 Laboratory.—Dynamo machines	2

5 COURSE IN BIOLOGY

Sophomore Year

First Term

	Hours a week
1 Experimental Chemistry.—Chemical experiments (first two months of term)	2
2 Blowpipe Analysis.—Lectures (last month of term)	2
3 Chemical Laboratory Practice.—Experimental chemistry and blowpipe analysis	11

Second Term

1 Qualitative Analysis.—Fresenius; lectures	2
2 Chemical Laboratory Practice.—Qualitative analysis	11

Third Term

1 Qualitative Analysis.—Fresenius; lectures	2
2 Chemical Laboratory Practice.—Qualitative analysis	11

Junior Year

First Term

1 General Biology.—Parker's *Lessons*	5
2 Biological Laboratory Practice	4

Second Term

1 Anatomy of Invertebrates	3
2 Vegetable Histology	2
3 Zoölogical Laboratory Practice	4
4 Botanical Laboratory Practice	4

Third Term

1 Vegetable Histology	4
2 Anatomy and Physiology of Insects	4
3 Botanical Laboratory Practice	4
4 Entomological Laboratory Practice	2

Senior Year

First Term

	Hours a week
1 Anatomy and Histology of Vertebrates	4
2 Systematic Entomology	5
3 Zoölogical Laboratory Practice	4
4 Entomological Laboratory Practice	2

Second Term

1 Embryology and Mammalian Anatomy	5
2 Vegetable Physiology	4
3 Zoölogical Laboratory Practice	4
4 Botanical Laboratory Practice	4

Third Term

1 Economic Botany; Vegetable Pathology	4
2 Economic Entomology	5
3 Botanical Laboratory Practice	4
4 Entomological Laboratory Practice	2

6 COURSE IN CLAY-WORKING AND CERAMICS

Sophomore Year

First Term

1 Experimental Chemistry.—Chemical experiments (first two months of term)	2
2 Blowpipe Analysis.—Lectures (last month of term)	2
3 Mathematics	3
4 Chemical Laboratory Practice.—Experimental chemistry and blowpipe analysis	8

Second Term

1 Qualitative Analysis.—Fresenius; lectures	2
2 Mathematics	3
3 Chemical Laboratory Practice.—Qualitative analysis	8

Third Term

1 Qualitative Analysis.—Fresenius; lectures	2
2 Mathematics	3
3 Chemical Laboratory Practice.—Qualitative analysis	8

Junior Year

First Term

	Hours a week
1 Quantitative Analysis.—Fresenius; Cairns; lectures	2
2 Ceramics.—Origin and nature of clays	3
3 Chemical Laboratory Practice	8

Second Term

1 Ceramics.—Bodies	4
2 Crystallography	1
3 Chemical Laboratory Practice.—Analysis of silicates	8

Third Term

1 Stoichiometry	3
2 Determinative Mineralogy	5
3 Chemical Laboratory Practice.—Analysis of silicates	8

Senior Year

First Term

1 Economic Geology	2
2 Ceramics.—Glazes, enamels	6
3 Technical Literature	1
4 Ceramic Laboratory Practice	8

Second Term

1 Economic Geology	2
2 Ceramics.—Theory of drying and firing	6
3 Technical Literature	1
4 Ceramic Laboratory Practice	8

Third Term

1 Ceramics.—Clay products individually considered	8
2 Technical Literature	1
3 Ceramic Laboratory Practice	8

SHORT COURSE IN CLAY-WORKING AND CERAMICS

First Year

First Term

	Hours a week
1 Experimental Chemistry (first two months of term)	2
2 Blowpipe Analysis (last month of term)	2
3 Chemistry.—Lectures, with experiments	4
4 Ceramics.—Lectures	3
5 Physics.—Ganot; lectures	3
6 Chemical Laboratory Practice	8

Second Term

1 Qualitative Analysis.—Lectures	2
2 Physics.—Ganot; lectures	3
3 Chemistry.—Lectures, with experiments	3
4 Ceramics.—Lectures	4
5 Chemical Laboratory Practice	8

Third Term

1 Chemistry.—Lectures, with experiments	3
2 Physics.—Ganot; lectures	3
3 Ceramics.—Lectures	3
4 Chemical Laboratory Practice	12

Second Year

First Term

1 Ceramics.—Lectures	6
2 Geology.—Brigham	2
3 Quantitative Analysis.—Lectures	2
4 Chemical Laboratory Practice	8
5 Draughting	4

Second Term

1 Ceramics.—Lectures	6
2 Geology.—Brigham	2
3 Power and Power Transmission	2
4 Ceramic Laboratory Practice	8
5 Draughting	4

Third Term

1 Ceramics.—Lectures	8
2 Chemistry of Engineering Materials	3
3 Ceramic Laboratory Practice	8
4 Draughting	4

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5 DESCRIPTION OF THE COURSES OF STUDY

PRESCRIBED STUDIES

All candidates for the degree of B.Sc. pursue a certain number of subjects in common, in addition to the more specialized studies of the various elective courses. The purpose is to give all who take the bachelor's degree such general training as shall make them broadly educated and intelligent citizens. These prescribed studies may be grouped as follows:

AGRICULTURE AND THE NATURAL SCIENCES

AGRICULTURE.—This is required two hours a week during the first term of the freshman year. The aim is to give the student definite information concerning the formation and composition of soils, the growth and development of plants and animals, the transformation and uses of the various farm products, and the relation of farming to other industries.

ZOÖLOGY.—This is required in the winter term, freshman year, two hours weekly. Systematic zoölogy in the old sense is not taught. The aim is to present, as far as the time will allow, a few of the great biological principles which are illustrated in the animal kingdom. There is introduced, therefore, considerable physiology as well as morphology. The student gets a practical knowledge of what is meant by anatomy, histology, development, classification, nutrition, protoplasm, differentiation, heredity, etc. For the present year Jordan, Kellogg and Heath's *Animal Studies* is used as a text-book, supplemented by demonstrations from specimens, charts, and Auzoux models.

BOTANY.—Students in all courses take botany two hours a week in the third term of the freshman year, and the ground covered is embraced by Gray's *Revised Lessons*. In connection with the text-book work, each student makes drawings and descriptions of leaves, stems, roots and other parts of plants. This

is followed by a thorough study of the flower from living specimens gathered in the field. The terms used in descriptive botany are dwelt upon, so that each member of the class becomes familiar with the methods of determining the botanical names of plants, and acquaints himself with the relationship of genera and orders. Students are taught the methods of preparing and mounting herbarium specimens, and are required to make collections of their own.

General Chemistry.—This is taught from a text-book and fully illustrated by experimental lectures, during two terms of the sophomore year. The purpose is to make the student understand the sure basis of fact upon which the science of chemistry rests, and to reason for himself from these facts. He is also taught to make a careful distinction between facts and theories, and not to confound that which is proved with that which is merely speculative.

Organic Chemistry.—This begins in the third term of sophomore year, so that students looking toward agriculture and biology, as well as chemistry, can get some idea of the chemical changes connected with their prospective subjects before more detailed study comes. The general behavior of carbon in its compounds is considered, and the different classes it forms, as well as their relations, are studied, so that the fundamental chemical changes concerned in the growth of plant or animal can be properly understood by students in these courses. The subject is also continued through the first two terms of the junior year, in the Chemical Course.

Physics.—Three hours weekly, during the entire sophomore year, are devoted to this subject. The presentation is by lectures, covering the ground of the text-books of Ganot and Deschanel. Recitations are both oral and written, special attention being given to deduction of the general from particulars, as well as to inferences from general principles. The course is supplemented by detailed study of the physical basis of practical machinery, during the first term of the junior year.

Astronomy.—General Astronomy is taught during the first term to all the members of the Junior Class. The object of this study is to acquaint the student with the leading facts and discoveries of the new astronomy, and to present the methods and principles of modern astronomical research. The daily recitations are supplemented by lectures illustrated by photographic lantern views obtained from the principal observatories of the world.

Mineralogy.—This is taught in the second term of the junior year. A text-book is used, but the subject is amplified and explained by lectures, and fully illustrated by specimens from the rich College collections. The course includes a study of the crystal forms of minerals, their physical and chemical properties, classification and description of the more important species. The determinative work in the third term consists of laboratory study of the physical and chemical characters of minerals; of practice in the determination of unknown specimens by means of these characters and by comparison with the labeled specimens of the systematic collections, and of practice in identifying minerals at sight by the use of unlabeled collections.

Geology.—Geology, which is prescribed in the first two terms of the senior year, is taught by text-book, supplemented by lectures and abundantly illustrated by specimens taken from the extensive College collections. Students are urged to use these collections freely for comparison and closer study in such time as they may find available. The Museum is kept open regularly on weekdays for this purpose and for the benefit of visitors; and not only are the mounted specimens on exhibition available for inspection, but much valuable material that is stored in drawers may also be studied when desired.

MATHEMATICS

During the first year all students of the Scientific School are instructed in algebra, trigonometry, surveying and draughting. Algebra is completed and the students receive field practice in

surveying sufficient to make them familiar with the uses of the compass and transit, and able to determine magnetic variations.

At the beginning of the second year the student elects the course he will pursue during the rest of his undergraduate study, and as the mathematics varies with the course elected, the student is referred for further details to the description of the elective courses.

GRAPHICS

The instruction in this department is oral, and by illustration or supervision, except in descriptive geometry. In this subject a text-book is used in the recitation-room, while the principles there discussed are more fully illustrated by problems assigned for graphical solution in the draughting-room. When the student has acquired some facility in the use of instruments, he is taught the methods of projections, intersections and developments of simple geometrical surfaces. In the sophomore year the course in drawing is based on descriptive geometry. Besides the solution of problems in solid geometry, the course includes practice in shades and shadows and linear perspective, the work being all directed by mathematical principles.

During the junior and senior years, the aim of the instruction is to acquaint the student with some of the many applications of the principles of drawing bearing especially on the subjects included in the course which he has elected, special stress being laid on the applications of graphical statics. The design is to prepare intelligent and ready draughtsmen, familiar with fundamental principles and methods, and to give the student a safe beginning on which to grow more easily and surely into the work of the practical designer.

ENGLISH

English Language and Literature.—In the department of English the students are required, in the second and third terms of the freshman year, to study the history of the English language, the history of English literature, and selections of

English prose and poetry; and, throughout the sophomore year, to write essays in literary criticism which call for the careful study of the best authors. This is supplemented in the freshman year by a systematic course of private reading prescribed for examination. The instruction is given through text-books, lectures and class papers, in recitations, researches and essays. The course aims to create a love for literature, train the student in interpretation and critical study, and impart so much of the literature itself as will enrich his mind with the best thought and his speech with the most expressive diction, of our mother tongue.

Rhetoric.—In the Department of Rhetoric, the study of which is begun during the freshman year, an effort is made to teach the principles of composition, not as laid down in mechanical rules, but as springing from psychological laws and relations. Ideas, when presented in accordance with various mental requirements and influences, are shown to contain the true philosophy of rational and effective discourse.

Illustrative references to the masterpieces of oratory, and to other forms of the best English classical literature, are freely given. Essays are required throughout the entire course.

Elocution.—The aim is to develop effective delivery in forms of expression. The scope of instruction embraces physical culture, respiration, training of the voice, and cultivation of the powers by which thought is analyzed and presented in synthetic expression.

Extempore Speaking.—The Bussing prizes for excellence in extempore speaking are designed to cultivate the habit of presenting clearly, forcibly and accurately, and in a manner to convince an audience, the facts and ideas a student has upon themes with which he may fairly be supposed to be somewhat conversant. The repeated competition for these prizes has produced excellent results.

MODERN LANGUAGES

French.—French is taught five hours a week throughout the freshman year as a required study. During the first term especial attention is paid to pronunciation, and inflection and syntax.

In the second term a large amount of simple prose is read. In the third term the selections offer greater difficulties, and the literary form is studied as well as the language itself. The required course is intended to give to all a practical acquaintance with the language, wide enough to enable them to read ordinary French prose at sight.

GERMAN.—German is taught three hours a week during the first term, and four hours a week during the second and third terms of the sophomore year, as a required subject. During the first term, the grammar is the main object of study, with constant practice in the translation of illustrative sentences, both from German into English and from English into German. In the second term easy German prose is read, both in set lessons and at sight, and in the third, more difficult selections, with study of the literary form. It is the aim of the required course in German to give all the students a competent knowledge of the grammar, and a sufficiently large vocabulary to be able to read ordinary prose and to pursue further study by themselves with ease.

Students who are prepared to pass the entrance examination required of the Classical Sophomores (covering one year's work), may, if the schedule permits, take the more advanced work given to that class, and are advised to do so if possible.

POLITICAL SCIENCE AND HISTORY

CIVICS.—The President meets the Freshman Class one hour each week during the first term, for their instruction by use of text-book and lecture in the elements of civics and the duties of the citizen.

POLITICAL ECONOMY.—The Senior Class receives instruction in the principles of political economy four hours weekly during the first term. In addition to the use of a text-book, lectures, formal and informal, are given, discussions are held, special topics are assigned to individuals for careful study, the results of

which are read before the class, and essays are prepared by the class on some subject chosen by the writer from a number relating to this science.

Constitutional Law.—The Senior Class pursues the study of constitutional law four hours weekly during the winter term. Cooley's *Principles of Constitutional Law* is used as a text-book. Lectures are read by the President before the class on the historical development of the Constitution, and some of the more important decisions of the Supreme Court are analyzed, for example, those relating to the prohibition of state laws impairing the obligation of contracts, the legal tender cases, and others of importance and paramount significance. The aim is to ground all the students in a knowledge of the elements of constitutional law and to give a special preparation to those about to choose the profession of the law. This is particularly kept in view in assigning the subjects for the essays which accompany the other work of the term.

International Law.—This subject is taken up the last term of the senior year. Lectures are given by the President four hours weekly. The peculiar character of this branch of law is dwelt upon, its development, the authorities and sources, and its present status.

History.—For students in the Scientific School the study of history is begun in the junior year with the use of a text-book as a guide. The course embraces a study of European history from the fall of the Roman Empire to the outbreak of the French Revolution.

The method of instruction is to some extent topical, and aims to furnish information essential to good citizenship, to cultivate a habit of investigation, and to teach the student how to come to independent conclusions. Students are encouraged to use the library, are given directions in methods of historical work, and are taught the value of historical sources.

PHILOSOPHY, LOGIC AND ETHICS

PHILOSOPHY AND LOGIC.—The Reverend Doctor F. S. Schenck, Professor of Practical Theology in the New Brunswick Theological Seminary, has been placed in charge of the Department of Philosophy and Logic pending the election of a successor to the late Professor Cooper.

Doctor Schenck teaches by means of text-books and supplemental lectures.

The Junior Class study psychology the first term, the text-book being *Psychology, Briefer Course,* by W. James, and logic the second term, two hours a week in both instances.

ETHICS.—In the third term the Senior Class pursues the study of Practical Ethics in Mackenzie's *Ethics.*

MILITARY DEPARTMENT

This department is in charge of the Professor of Military Science and Tactics, an officer of the regular army, detailed by the War Department for the purpose.

In the Gymnasium a drill-room and armory have been provided for purposes of military instruction.

The object of instruction in this department is not only to comply with the requirements of the laws of Congress for the State Colleges organized under the act of 2d July, 1862, but also to improve the health and physique of students, and to give that elementary military knowledge which every citizen should possess that he may render intelligent and effective aid to his country or state in case of war or riots.

The instruction is both practical and theoretical.

PRACTICAL.—The student, on entering college, is drilled in the School of the Soldier, and is advanced, successively, to the Schools of the Company and Battalion.

Considerable attention is given to military signaling and target practice, the College being supplied with latest-model Springfield rifles and a liberal supply of rifle ammunition.

THEORETICAL.—During the junior and senior years, elementary instruction, by means of lectures and recitations, is given in the art and science of war, modern tactics, modern small arms and cannon, explosives, military correspondence and reports, care of troops in the field, military and martial law, the regular army, the volunteers, the militia, and other military subjects.

UNIFORM.—A uniform, consisting of cap, blouse and trousers of dark blue cloth, has been adopted, the cost of which is about $14, or considerably less than that of a good suit of civilian's clothes. The entire suit is neat and serviceable, and, while required to be worn at drills, may be worn on any occasion.

MILITARY DRILL.—This is required of all students in the Scientific School twice each week throughout the entire course, except as they may be excused by reason of conscientious scruples, physical disability, or some similarly valid reason.

PHYSICAL TRAINING

Exceptionally fine opportunities for physical training are afforded to all students by the Robert F. Ballantine Gymnasium, Neilson Field and the Boathouse, which are elsewhere described.

At the beginning of his freshman year each student is given a physical examination, conducted upon the plan now in use at the leading colleges, and a complete record is made of his physical condition. This examination is repeated from time to time, and thus affords valuable information concerning the growth and development of the individual. At the time of the examination an anthropometric chart is drawn, showing the relation of the individual to the normal standard in size, strength and symmetry. From the information thus obtained cards are made out, specifying the exercises most suitable for each case.

With the students in the Scientific School, gymnasium attendance is optional. Classes are formed to suit the general convenience, and a progressive course of instruction is followed.

During the winter term students in the two higher classes may receive instruction in fencing with foils and singlesticks.

Swimming is regularly taught during the spring term.

Students are required, before enrollment by the manager of an athletic team or organization, or before entering their names for match contests, to secure from the Instructor in Physical Training a certificate good for the current college year, stating that the candidate is physically fit for such contests.

ELECTIVE COURSES

COURSE IN AGRICULTURE

The object of this course is to provide a broad scientific training, which is now recognized as essential to the best life on the farm.

The major studies of this course include applied agriculture, biology, botany and entomology.

Agriculture.—The study of the principles of scientific agriculture and the applications to the different lines of farm practice, is continued throughout both the junior and senior years. Ingle's *Manual of Agricultural Chemistry* supplemented by lecture-notes, soil-physics, and soil-bacteriology, are each studied in their relation to the production of plant-food and of plant-substance. The origin and the formation of soils are discussed, and the attempt is made to represent by chemical equations the reactions occurring in the soil in the transformation of the inert organic and inorganic substances into available plant-food. In the second term of the junior year the study of soils is taken up in greater detail, particularly that of soil physics as outlined in King's *The Soil*.

The first term of the senior year is devoted to the study of natural and artificial fertilizing materials. Aikman's *Manures*

and Manuring and Voorhees' *Fertilizers* are employed, and are supplemented by discussions and illustrations. Inquiry is made as to the sources and composition of manures and fertilizers, as well as the manufacture and application of the latter. Special attention is given to the comparative study of commercial and agricultural values, and the preparation of fertilizer mixtures for specific purposes. The second and third terms of the senior year include the study of feeds and feeding. The sources, composition and digestibility of both concentrates and roughages for farm animals are studied, and careful attention is given to the study of digestion coefficients and the compounding of feeding rations, as applied to given agricultural and economic conditions. The physiological processes of digestion and assimilation are carefully discussed in their relation to feeds and feeding, under varying conditions of agricultural practice.

A portion of the year is also devoted to the study of milk in its chemical and bacteriological relations; its production under modern hygienic conditions; its handling; its distribution; its manufacture into butter, cheese or other derivatives. The production of milk is studied likewise in connection with the general subject of dairy husbandry, including the methods of crop production on the dairy farm.

This is followed by the study of breeds and breeding and the intelligent selection of desirable types of animals. Proper consideration is accorded to the origin, characteristics and relative value of the prominent breeds of dairy cattle for one purpose or another.

Biology.—In the freshman year the students in agriculture pursue zoölogy two hours a week the second term, reciting with the other students of the Scientific School.

In the junior and senior years, fall and winter terms, students in agriculture devote two morning hours and two afternoons a week to general biology, as follows: general biology of plants, first half of fall term, junior year; general biology of animals, second half of same term; invertebrate zoölogy, winter term; vertebrate zoölogy and comparative embryology, in the fall term.

senior year; comparative anatomy of the domesticated animals and economic zoölogy in the winter term.

While students in the Course in Agriculture devote less time to biological subjects than is required of students in the Course in Biology, with whom they meet, the portions of the work to which they give attention are chosen with especial reference to their needs. The study of the anatomy of domestic animals is furthered by demonstrations from a fine Auzoux model of the horse.

For further details see the fuller description of these courses under the Course in Biology.

Botany.—In the second term of the junior year the students examine with the compound microscope the minute structure of the leaves, stems, roots, flowers and seeds of various plants. The accompanying class-room exercises consist of recitations upon, and elaborations of, the work pursued in the laboratory.

During the third term the microscopic study of plants is continued, time being taken for making a herbarium of fifty species of flowering plants, named and neatly mounted.

In the second term of the senior year a course of lectures is given upon vegetable physiology, and laboratory exercises are continued with ferns, mosses, lichens, algæ, etc.

During the third term special attention is given to the various kinds of parasitic fungi, including rusts, mildews, moulds and blights, so destructive to crops.

Entomology.—The course in this subject begins in the third term of the junior year and is continued in the first and third terms of the senior year. Smith's *Economic Entomology* is used as a text-book, and during the first term the student will be made acquainted with those structures and physiological peculiarities which are essential to a proper understanding of the problems of economic entomology. The aim is to give as thorough a knowledge as possible of the foundations of the science, that the student may be able to build upon it afterward without further assistance.

In the senior year the classification of insects is considered, and the orders are taken up in turn, the chief injurious forms

Van Nest Hall Rutgers

in each serving as types. Throughout the course laboratory work is required, and specimens are studied, so selected as to give the student a comprehensive idea of the variations to be found in this class of the animal kingdom. In the course of the last term the subjects of insecticides and insecticide machinery are taken up, and the practical work of controlling insect pests is chiefly considered.

COURSE IN CIVIL ENGINEERING AND MECHANICS

The object of this course is to ground the student well in mathematics, and to give him a substantial knowledge of the theory of civil engineering.

The work in mathematics for students in this course presupposes a good knowledge of plane and solid geometry, of elementary and advanced algebra, and of plane and spherical trignometry.

During the last three years the students in this course are instructed in descriptive geometry, analytic geometry, railroad curves, differential and integral calculus, analytic mechanics, hydromechanics, civil engineering, bridge-building and geodesy; and have practice two afternoons a week in draughting, with exercises and problems in geometrical constructions, in descriptive geometry, topographical, mechanical and architectural drawing, and in graphical statics.

These subjects, with the exception of geodesy, are taught by means of text-books, supplemented with numerous practical examples in descriptive geometry, analytic geometry, railroad curves, differential and integral calculus, statics, kinematics and kinetics, hydromechanics, roofs and bridges.

The course in hydromechanics embraces a study of the principles of hydrostatics and hydraulics, including the laws of the flow of water through orifices, pipes, tubes, weirs and open channels, with numerous problems illustrating many of the practical applications of these principles.

The course in roofs and bridges embraces a study of the theory and computation of the stresses in roof and bridge trusses under

dead, live and wind loads, and under locomotive-wheel loads on bridge trusses, and numerous problems for illustrating the principles.

Geodesy is taught by means of lectures, including many practical examples from the United States Coast and Geodetic Survey, which the student is required to work out. He is taught how to measure baselines and reduce them to the sea level, how to measure angles and adjust them by the method of least squares, and how to compute latitudes, longitudes and azimuths from the field notes.

A summer school for field practice in surveying and railroad engineering has been conducted during several weeks of the summer vacations each year since 1899, for the benefit of those members of the Junior and Freshman Classes who have chosen to avail themselves of the opportunity.

A course of special lectures is given during the year to the students choosing the Course in Civil Engineering and Mechanics, by men who have attained eminence in the practice of civil engineering.

COURSE IN CHEMISTRY

During the last three years students in this course are instructed in general, experimental and agricultural chemistry, crystallography, blowpipe analysis, descriptive and determinative mineralogy, analytical, organic, applied and theoretical chemistry.

Experimental Chemistry.—This is taught by carefully conducted quizzes in the recitation-room and full work in the laboratory. The student's first and general knowledge of chemistry is obtained by his own observation.

Blowpipe Analysis.—This comprises the study of the various reactions and the analysis of a number of substances. Laboratory work is accompanied with constant quizzing in the recitation-room.

General Chemistry.—This is taught from a text-book fully illustrated by experimental lectures, during two terms of the sophomore year.

Organic Chemistry.—This begins in the third term of sophomore year. In the first and second terms of junior year the subject is continued by students in the Course in Chemistry. The student is constantly questioned and expected to show a thorough knowledge of all principles developed in the text-book. He also is given imaginary problems and taught how to plan an investigation with carbon compounds, thereby gaining a theoretical knowledge of the methods of research in this subject. Laboratory work follows in the senior year. The lectures are accompanied by full experimental illustrations.

Analytical Chemistry.—The student commences with experiments on bodies of known composition, performing those experiments that characterize common, simple substances, until he is perfectly familiar with the reactions, both theoretically and experimentally, the theoretical part being considered in the classroom. Then complicated bodies are examined, until the most difficult substances are readily analyzed.

Quantitative Analysis.—This is taught in a similar way to analytical chemistry. The student first analyzes substances of known composition until perfectly familiar with the peculiar manipulation in this subject. Then he proceeds to substances of unknown composition. Through one college year instruction is given, with recitations and questionings during the first term.

Stoichiometry.—This is taught by lecture, recitation and blackboard drill.

Applied Chemistry.—The application of chemistry to the arts and manufactures is taught by lectures and text-book. Whenever it is practicable, the actual products are exhibited to the students, and the manufacturing processes reproduced in miniature. Attention is drawn to the scientific relations and con-

nections between the various manufactures. The great losses by imperfect methods of manufacture and by waste products are pointed out, and the student is taught to see the true economy of production. Illustrative of the lectures, visits are made to various manufacturing establishments, of which there are a number in and about New Brunswick, and an opportunity is given to see manufacturing operations in actual working.

The Principles and Theories of Chemistry.—These have recently developed in a very remarkable way and form a most important branch of chemistry. Accordingly, the subject extends throughout the senior year, including class-room work and laboratory practice, the necessary mathematics having been studied in the sophomore year.

Thesis.—After finishing experimental organic chemistry the student takes up work for his thesis, the subject of which is chosen by him under the approval of the instructor.

Mineralogy.—This is taught in the junior year. In the second term there is a course in descriptive mineralogy, in which the general characters of minerals are discussed, and some of the most important species are carefully studied. Special attention is paid to Crystallography, because of its importance in determinative mineralogy, which occupies the third term. In this part of the course the student learns to make the tests by which minerals are distinguished from each other, and becomes familiar with their differences by actual handling and comparison.

Course in Electricity

This course is so arranged as to give a thorough training in the principles and laws that form the foundation of electrical engineering.

During the freshman and sophomore years it is identical with the Course in Civil Engineering and Mechanics, including, therefore, the mathematics, draughting, chemistry, and physics of the latter, which are essential to a thorough comprehension of the

electrical work of the latter years; and furnishing, also, a general training in French, German and English.

In the junior year the general principles of the steam engine and other prime movers are taught, and the study of direct current apparatus is begun. The students are required to spend two hours per week in the physical laboratory during two terms, and in the chemical laboratory during one term.

In the senior year, the study of direct current is completed, and that of alternating current is taken up. Two hours per week throughout the year are spent in the electrical laboratory. During the first term four hours per week are devoted to machine-drawing, and in the second term an equal amount of time is given to dynamo-design and switchboard drawing, the purpose being to enable the student to read any drawing.

THESIS.—A thesis upon some approved subject must be presented for graduation, and four hours per week are left free during the third term for this work.

LABORATORY.—The laboratory is provided with a steam engine, a gas engine, a gasolene engine, brake and transmission dynamometers, a six K. W. direct-current motor, a six K. W. direct-current dynamo, several smaller direct-current machines, and a General Electric double-current generator, which can be used to furnish either direct or alternating current, or to convert from direct to alternating current and vice versa; an alternator, designed and built by one of the students; ammeters, voltmeters, and wattmeters (Weston); an electro-dynamometer, galvanometers, and a Leeds and Northrop potentiometer for standardizing measuring instruments; standards of electro-motive force, of resistance, and of self-induction; a secohmmeter, a storage battery, resistance boxes, condensers, and other electric apparatus.

COURSE IN BIOLOGY

Students electing this course divide the time between three departments (zoölogy, botany, entomology) during the junior and senior years, according to the following:

SCHEDULE FOR ELECTIVE BIOLOGY *

	JUNIOR YEAR		SENIOR YEAR	
First term,..	General biology of lower cryptogams	General biology of lower invertebrates	Systematic entomology	Osteology, and histology of lower vertebrates
Second term,	Vegetable histology	Zoölogy of higher invertebrates	Vegetable physiology	Embryology and mammalian anatomy
Third term,.	Vegetable histology	Anatomy and physiology of insects	Vegetable pathology	Systematic and economic entomology

* For the number of hours, see schedule on page 39

Zoölogy.—In the freshman year, second term, two hours a week are required of all students. For the present year Jordan, Kellogg and Heath's *Animal Studies* is used as a text-book, supplemented by lectures and demonstrations.

The elective work is mainly in the laboratory and is pursued by means of microscope and scalpel. The student sketches and describes the objects studied. Supplementary lectures are given. Each student provides himself with Parker's *Lessons in Elementary Biology* for the quiz work, and, for the laboratory, with a small case of instruments. Microscopes and other apparatus and materials are provided in the laboratory, for which a fee is required. For the present year the seniors use the following texts: Parker and Haswell's *Manual of Zoology* and Le Conte's *Comparative Physiology and Morphology.*

Botany.—Laboratory study in botany begins in the second term of the junior year, and students then pursue, with the compound microscope, a course in vegetable anatomy, in which they are introduced to the various kinds of tissues and tissue systems, as illustrated in the leaves, stems and roots of the higher plants.

In the third term laboratory practice is continued with the histology of the organs of reproduction, and the collecting of plants in the field is begun. Each student prepares a herbarium of at least fifty species, all neatly mounted and fully labeled.

The Seniors, in their second term, have a course of lectures upon vegetable physiology, special attention being paid to the origin of varieties through cross-fertilization and other causes. In the laboratory each member of the class becomes familiar, microscopically, with the histology of cryptogams, particularly those best enforcing the principles in physiology considered in the class-room. The third term is especially devoted to a consideration of those low organisms that are imperfectly known under the general term of the fungous diseases of plants, and give rise to that branch of economic botany, now called vegetable pathology.

Entomology.—This is taught for three terms, beginning in the third term of the junior year and continuing during the first and third terms of the senior year. During the first term the anatomy and physiology of insects are studied, largely from specimens in laboratory work, and partly by the assistance of Auzoux models. The students are required to make dissections and careful descriptions of the specimens studied, that they may have, from actual observation, a good knowledge of insect structure, the basis upon which all future thorough study must rest. The outline of classification follows, in which the orders are taken up separately, leading types of each being selected for purposes of study. Especial attention is paid to the morphological and biological side of the science.

In the last term of the senior year the students are required to prepare and arrange collections made in part by themselves. A very full collection of insects of the United States, including the principal injurious forms, is at hand for the purposes of comparison and study. The aim is to give such a knowledge of the subject, as a whole, as will enable the student to specialize without further assistance, should he desire to continue the study at the conclusion of the course. Smith's *Economic Entomology* is used as a text-book.

COURSE IN CLAY-WORKING AND CERAMICS

A necessary preparation for this course is a thorough training in the principles of chemistry, with sufficient laboratory practice to enable the student to determine accurately the chemical and the rational analysis of clays. This portion of the work is done during the sophomore and the junior years in the chemical laboratory. Knowledge of the principles is also imparted by lectures and quizzes.

As the ceramist is engaged in working with raw materials mined from the earth, it is proper and necessary that he should have a knowledge of the history and structure of the earth's crust. The student is therefore taught the sciences of crystallography, determinative mineralogy, general and economic geology.

The world over, there are men of science seeking for the true interpretation of problems that confront them in the laboratory or the manufactory. To keep in touch with these workers we must have recourse to the published results of their investigation. No man therefore is properly equipped until he can use the scientific journals as a tool. A practical knowledge of French and German at least is necessary, and provision is made in the course for reports by the students based on papers published in current numbers of scientific journals.

During the junior and senior years there are lectures and recitations on the origin and the nature of clays, the mechanical and the chemical preparation of bodies, the theory of the construction of glazes and enamels, the theory of drying and firing, and clay products, individually considered. These are supplemented by practical work in the laboratory, where the excellent facilities of the department equipment permit of practical demonstration in the manufacture of a wide range of ceramic wares.

Instruction is also given in the use of various fuels, construction of kilns and machinery.

Further, the location of the department should be noted as exceedingly fortunate. On one hand are the famous Trenton potteries, while even nearer are the very extensive brick-making

plants located along the Raritan River. Students following this course of study may visit these industries to their profit.

SHORT COURSE IN CLAY WORKING AND CERAMICS

This course is designed for two classes of students: First, Practical clay-workers with at least one year's experience in some manufacturing branch of the ceramic industries, provided that they pass a satisfactory examination in arithmetic, including the metric system, in elementary chemistry (Steele's, Cooley's or Remsen's *Chemistry,* or an equivalent text-book), in elementary physics (Wells' or Cooley's *Natural Philosophy,* or an equivalent). Second, Other students who can fulfill the conditions prescribed for admission to the freshman class of the Scientific School. Practice in rhetorical exercises (writing essays and pronouncing declamations) uniform with that of the freshman and sophomore classes is required of members of this class.

The two-years course has been arranged especially for the benefit of earnest, ambitious young clay-workers who desire to perfect themselves in their craft, but are unable for various reasons to take the full course of four years. The entrance requirements have been reduced to the minimum consistent with an intelligent introduction to the work; and the studies pursued are only those having the most intimate relation to the work. It is not designed as a substitute for the more extended course, nor is it intended to encourage the attendance of the incompetent; on the contrary it is hoped that all who avail themselves of the opportunity offered will strive diligently to counterbalance their limited equipment by earnest devotion to their special study.

The short course does not lead to a degree, but a certificate will be given to those who complete the work.

OPTIONAL STUDIES

The members of the Senior Class in the Scientific School may attend the lectures upon the fine arts and upon the history and art of teaching which are delivered each year before the Senior Class in the Classical School.

In addition to the maintenance of a satisfactory standing in the prescribed and elective studies, regular attendance upon the lectures and upon the examinations in optional subjects is required.

THE FINE ARTS

During the second term of this year there will be for the Seniors a course of lectures by Professor Van Dyke on the history of painting, covering the ground from the earliest records of art in history to the present day. Van Dyke's *History of Painting* will be used as a text-book, and all the lectures will be illustrated by lantern slides and by the casts, photographs and facsimiles of the Fine Arts collection.

HISTORY AND ART OF TEACHING

Instruction is given by means of lectures during one term of the senior year to the students of the Classical School. Others who expect to teach, or who are interested in the subject, are allowed to attend the lectures.

The object of the course is to make the student acquainted with the most important educational theories and their place in history, and to introduce him to the study of the science and art of teaching. The principal educational classics are considered, and such practical work is done by reports and discussions as the time permits.

Third Annual Report of the Department of Clay-working and Ceramics of the Rutgers Scientific School

The New Jersey State College for the Benefit of Agriculture and the Mechanic Arts, New Brunswick, N. J.

For the Fiscal Year Ending October 31st, 1904.

Financial Statement

The Trustees of Rutgers College for the New Jersey State Agricultural College

In Account with The Department of Clay-working and Ceramics Appropriation, 1904

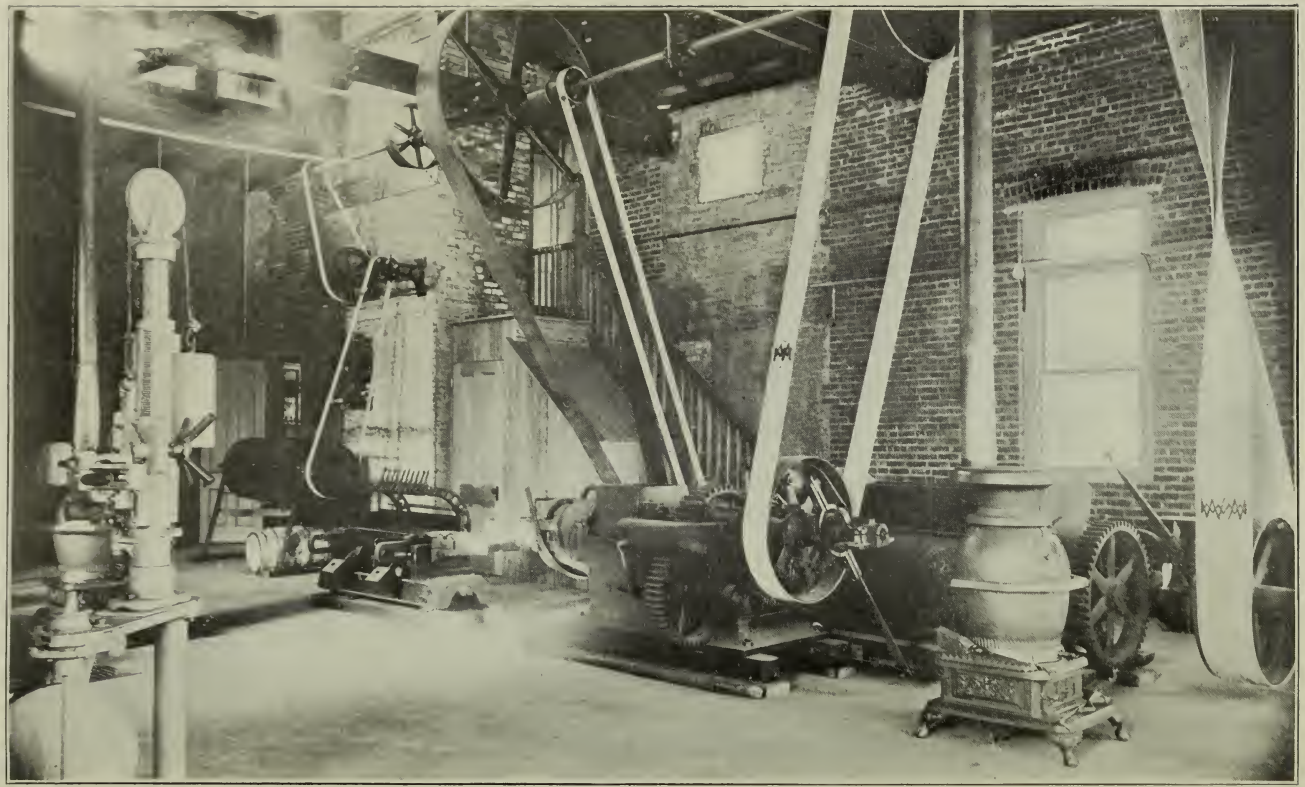
Dr.

To receipts from the Treasurer of the State of New Jersey, as per appropriation, for the fiscal year ending 31st October, 1904, as per Laws of New Jersey, 1903, chapter 273, section 85,		$2,500 00
By Salaries,	$1,500 00	
Labor,	111 50	
Postage and stationery,	14 36	
Freight and express,	12 47	
Fuel, light and water,	260 39	
Chemical supplies,	13 30	
Supplies of materials,	3 54	
Sundry supplies,	58 40	
Library,	58 79	
Tools, implements and machinery,	33 23	
Furniture and fixtures,	44 83	
Scientific apparatus,	185 27	
Traveling expenses,	123 82	
Contingent expenses,	43 50	
Building and repairs,	36 60	
Total,		$2,500 00

We, the undersigned duly appointed auditors of the corporation, do hereby certify that we have examined the books and accounts of the Department of Clay-working and Ceramics for the fiscal year of the State ending October 31st, 1904; that we have found the same well kept and classified as above, and that the receipts for the year from the Treasurer of the State of New Jersey are shown to have been $2500, and the corresponding disbursements $2500, for all of which proper vouchers are on file, and have been by us examined and found correct, thus leaving no unexpended balance.

And we further certify that the expenditures have been solely for the purpose set forth in the Laws of New Jersey, 1903, chapter 273, section 85.

AUSTIN SCOTT
WILLIAM H. LEUPP
Auditors



A View of the Brick-making Outfit

Department of Clay-working and Ceramics

Report of the Director, Cullen W. Parmelee

The college year which closed on 22d June, 1904, may be regarded as entirely successful for the department. It marked the completion of the first full course of work, and both the work and the equipment have proved satisfactory. Nine students have attended the lectures, three of whom were graduate students, one from the College of the City of New York, and two alumni of Rutgers. Four students were graduated from the full course in June. Their names and the subjects of their graduation theses are:

Harold Blackman Osborn, "The Limits of Raw Lead Glazes as Applied to a Plastic Body"

Herbert Wills Moore, "The Substitution of Calcium Phosphate for Calcium Carbonate in Glazes"

Herman Arthur Plusch, "Crystalline Glazes"

Fritz Carl Wittig, "A Comparison of the Use of Magnesium Carbonate for Calcium Carbonate in Porcelain Glazes"

Within a short time after commencement four of the students were engaged in the clay-working industries.

The graduate students and the Seniors, accompanied by me, have made frequent excursions during the college year examining clay-pits, potteries, glass, tile, stoneware and terra cotta factories.

We have frequently been visited by potters, brick-makers and workers in these trades. The members of the Board of Visitors of the State Scientific School have on the occasions of their visits of inspection during this year expressed their interest in and approval of the course of instruction and progress of the students. During the summer we were honored by the visit of Nils Fredriksson, Director of the Clay-workers School at Svedala, Sweden.

Mr. Fredriksson was commissioned by his government to visit the Louisiana Purchase Exposition and the clay-working industries of this country. Another visitor was Doctor Wilhelm Pukall, Director of the Royal School of Ceramics at Bunzlau, Germany, and a juror at the St. Louis Fair. The Bunzlau School was founded in 1897. It receives from the State an annual appropriation of about eight thousand dollars. Instruction is given for two years for the full course, during which time the following are taken:

Drawing and painting
Modeling
Theoretical and practical chemistry and ceramics
Physics
Mineralogy and geology
German
Calculation
Work-shop instruction

The student completing this course may remain a third year and study some special work. This privilege is withheld from foreigners. Instruction is also given in an evening school, including such topics as German, calculation, book-keeping, drawing and modeling.

Doctor Pukall examined our equipment carefully and said that it is much superior to that of his school.

The library of the department has been found of notable service by clay-workers, who often have come some distance to enjoy the privilege of consulting it.

The following clay-working concerns and gentlemen have generously furnished us clays, sand, test pieces and other articles of use, namely: Trent Tile Company, Star Porcelain Company, the National Tile Company, Mr. C. H. Cook, of the Etruria Pottery, M. D. Valentine & Brother Company, Sayre & Fisher Company, Mr. Charles Bloomfield, Mr. D. R. Edgar. Further, we have Mr. Walter Griffin, United States Consul at Limoges, France, to thank for his fine gift of ceramic wares, clays, glaze and fuel. His gift comprises:

22 decorated Limoges plates
6 pieces of decorated Austrian ware
5 plates of decorated Austrian ware
11 pieces of plain Austrian ware
24 pieces of decorated Norwegian ware
2 pieces of Bavarian ware
2 pieces of Bohemian ware
1 large package of clay
1 large package of glaze
Setters and trial pieces
3 pieces of "jeweled ceramics"

This last item, "jeweled ceramics," is described by the New York agents of the French manufactures as "ware so delicate in its making that our people had to give it up, and that there are only comparatively few pieces of it in existence." It is exceedingly delicate and beautiful, and a valuable addiition to our cabinet.

The New Jersey State Agricultural College Experiment Station

By an act of Congress of 2d March, 1887, a law was passed entitled "An act to establish agricultural experiment stations in connection with the colleges established in the several states under the provisions of an act approved 2d July, 1862, and of the acts supplementary thereto." This act was commonly known as the "Hatch Act," from the active interest taken in its passage by Hon. William H. Hatch, M.C., of Missouri. It authorizes the appropriation of $15,000 annually for the support of agricultural experiment stations in connection with the colleges which were established in the several states, "for the benefit of agriculture and the mechanic arts," by the act of Congress of 2d July, 1862.

The Legislature of New Jersey, by its acts of 16th March, 1887, and of 5th March, 1888, designated the Trustees of Rutgers College "as the parties to whom all moneys appropriated by Congress under said acts of Congress or supplements thereto shall be paid for the purposes mentioned in said acts of Congress." The department of Rutgers College known as Rutgers Scientific School is, by law, the State Agricultural College. The Agricultural Experiment Station is established in connection with it.

By the coöperation of the State Experiment Station, a large and well-fitted laboratory has been erected, and investigations are made of the insect enemies of plants, of the food products of our fresh and salt waters, and of their improvement, of the diseases of plants and the application of science to the growth of agricultural and horticultural products, and of the food consumption and the value of the products of the best breeds of dairy cattle.

While the main business of such a station is in searching after new truths, and arranging them for practical and economic use, the proper location for it is in connection with an institution of learning. Almost all our investigators are teachers. The investigation and diffusion of knowledge necessarily go hand in

hand; and the example of men devoted to the searching for useful truths is stimulating to those who are yet in their preparatory studies, and are aspiring to fill well their places in life.

It is from those now preparing that our future investigators must come, and it is important that they should have those who are now in the field of work directly before them. In this respect it is believed that the location of the Station at the College is most salutary in its influence.

The foregoing report is respectfully submitted,

AUSTIN SCOTT
President

Winants Hall Dormitory Rutgers

General Information

General Information

EXAMINATIONS

The classes in both Schools are examined at the close of each term. These examinations are partly oral and partly written, and have an important bearing upon the standing of the student in his class.

Unexpected examinations at irregular intervals are held at the discretion of each instructor. The object of these examinations is to cultivate the habit of considering the relations of each day's work to what has been done before, and to stimulate effort on the part of each student to gain a comprehensive knowledge of the subjects studied.

At the end of the first and third terms, the examinations of the classes of the Scientific School are held in the presence of the Board of Visitors, who then make their semi-annual visits to the institution.

At the end of the third term each member of the graduating class is required to write a thesis on some subject approved by the professor, or professors, in charge of his elective course, or courses.

This thesis must be acceptable to the professor under whose direction it has been prepared, and the author is required to submit a copy suitable in all respects for binding and for permanent preservation in the College Library.

The final examination of the graduating class is held four weeks before Commencement, from which time they are subject to such duties as are required for their preparation for Commencement.

Students who receive conditions at the June examinations must report at the College prepared to be examined upon the

whole of each of the subjects on which they have conditions, at 10 A. M. on the Tuesday before College opens, in September.

GRADUATION

To members of the graduating class, Classical School, Classical Course, in full standing, the Trustees grant diplomas conferring the academic degree of Bachelor of Arts; or, if in the Latin Scientific Course, of Bachelor of Letters.

To all members of the graduating class of the Scientific School, in full standing, the Trustees grant diplomas conferring the academic degree of Bachelor of Science.

To students in either School, who have satisfactorily pursued special courses of study, a certificate is granted stating the studies pursued and the attainments made.

CLASS HONORS

The following regulations have been adopted by the Board of Trustees regarding the graduating exercises at Commencement:

1 Three scholarship honors shall be awarded in each school to those members of the graduating class who shall stand first, second and third, respectively, in general scholarship, provided that in each individual case the student so standing shall have maintained a high rank in the special and elective studies of his course.

A failure on the part of any candidate to fulfill this condition will render the student standing next in grade of general scholarship eligible, subject to the same condition.

2 There shall be no distinction by way of comparison between the scholarship honors of the Classical School and those of the Scientific School.

3 The three scholarship honors of each School shall be designated as follows:

CLASSICAL SCHOOL	SCIENTIFIC SCHOOL
First Honor—Philosophical Oration	First Honor—Scientific Oration
Second Honor	Second Honor
Third Honor	Third Honor

4 Three other orations shall be awarded to members of the graduating class in either School in the order of their grades in composition and elocution during the junior and senior years, but only those students are eligible who shall stand in general scholarship in the first half of their class.

The first of these orations shall be known as the Rhetorical Honor and may be awarded to a student who has also received one of the scholarship honors, in which case, however, he shall deliver but one oration at Commencement; the other two shall be awarded to students who have not received any of the scholarship honors.

SPECIAL HONORS

Special honors may be granted in each elective course. Such an honor will be granted to that student who stands highest in the particular elective course, on two conditions:

1 Provided that he stand in the first third of the classical or scientific section of his class in the required studies; and,

2 Provided that he be recommended to receive that honor by the professor or professors who have instructed him in the elective course.

Competition for special honors shall begin where the courses begin to diverge, *i. e.*, with the first term, junior year, in the Classical School, and with the first term, sophomore year, in the Scientific School.

GRADUATE DEGREES AND STUDIES

The Faculty will recommend for the degree of Master of Arts or Master of Science candidates otherwise properly qualified, who, after taking the appropriate Bachelor's degree—

1 Shall pursue for at least one year at Rutgers College a course of liberal and non-professional study, approved by the Faculty, and shall, beside the term examinations, pass a thorough exami-

nation on that course and present a thesis on some topic connected with it; or,

2 Not less than three years after taking the Bachelor's degree at Rutgers College, shall make application for the Master's degree, presenting at the same time a certificate of graduation from a theological seminary, a law school or a medical school, or of admission to the practice of law or medicine; or,

3 Shall present to the Faculty (at least one month before Commencement) satisfactory evidence by a thesis or by other proof, of successful labor in education or literature pursued during three consecutive years and of advanced studies prosecuted; or,

4 In case of Bachelor of Science shall give satisfactory evidence of successful professional work actually done, and advanced professional studies prosecuted.

The degrees of Doctor of Philosophy (Ph. D.) and Doctor of Science (D. Sc.) may be conferred upon resident graduates of the College who shall pursue for at least two years prescribed courses of study under the direction of the Faculty.

The conditions will be made known on application.

The degree of Civil Engineer (C. E.) is a professional one, and is, on application, conferred upon graduates of the College who have taken the degree of Bachelor of Science, and subsequently have passed three years in the practice and study of engineering, with results satisfactory to the Faculty.

The applicant is required to furnish a statement of the work upon which he has been engaged, and to present a thesis or discussion of some engineering work which he has done. The application and thesis must be presented to the Secretary of the Faculty at least one month before Commencement.

STUDENT SELF-GOVERNMENT

During the past eleven years the College has developed, Faculty and students coöperating, a system of student self-government. In 1893-94 special joint committees of Faculty and students, with equal representation of both bodies, were formed as cases for

discipline arose. In 1894-95 the Faculty and students instituted a standing joint committee for the year, consisting of the President of the College, two professors, two seniors, two juniors, one sophomore and one freshman. In 1895-96 a standing committee of students only was formed, having the President as presiding officer, with no vote save in case of a tie. This board consisted of four seniors, four juniors, two sophomores and two freshmen, chosen by their respective classes. In 1896-97 the Faculty, acting upon suggestions made by the student board, formulated a constitution, which was accepted for the year by the Trustees of the College and by the students. This constitution has been continued, under the approval of the Trustees. The names of the members of the student board will be found in the Register. A resolution of the Faculty of 28th September, 1896, states: "This experience has confirmed the Faculty's trust in the honor and good judgment of our students, its belief in their capacity for self-government, and in the value of the system as a part of their education in citizenship."

REGULATIONS

Morning prayers are attended in the College Chapel each morning, except Saturday and Sunday, at 8.40 o'clock.

A Bible class, attendance at which is voluntary, is held Sunday morning in the College Chapel at 10 o'clock.

A sermon is preached every Sunday morning in the College Chapel at 11 o'clock. Students are required to be present.

They are expected, also, to attend public worship in the afternoon or evening, at such place as their parents or guardians may direct.

Excuses for absence from all College duties must be obtained from the Registrar.

Unexcused absences are reported to the Faculty; and a student is not allowed to make up the recitations omitted, but receives zero as a mark.

Recitations, except in elective subjects, are marked on a scale of 100, and the average standing of each student is made up at the end of each term, and sent to his parent or guardian. A

mark at examination counts as much as one-third of the term's work up to the time of examination.

If the grade for the term's work previous to the examination, in any subject, fall below 60 per centum of the maximum, the student will be conditioned in that subject. If the grade in an examination in any subject fall below 60 per centum of the maximum, the student fails to pass the examination.

If the grade of any student in any study at any time fall below 60 per centum of the maximum, his case will be acted on as the Faculty shall deem necessary.

If any student's average grade in any term fall below 60 per centum of the maximum, he will lose his standing in his class and be required to fall back a year in the course, unless all his deficciencies shall be removed before the opening of the next term.

In elective courses the only official statement of work done is the announcement at the end of each term in each student's report, that he has passed "high," "medium," or "low," or has "failed." The marks given in elective work are not made public, and do not enter into the ordinary computation of grade. They serve only for the guidance of the professors concerned, and of the Faculty in determining the class honors at graduation.

If any student shall be found notably deficient in his daily recitations or at the examination, in any of his studies, his case will be reported to the Faculty, and such action by way of discipline will be taken as may be deemed necessary.

No student can be promoted to an advanced class until all his deficiencies are made up. If he fail to make up all his deficiencies before the opening of the College year, he will cease to be a member of his class; if he fail to make them up within two weeks after the opening of the College year, he will not be reinstated in his class but will be required to fall back a year in the course. Examinations for making up such deficiencies are held at 10 A. M. on the Monday and Tuesday before the opening of the College year, in September.

The Faculty are empowered to pass such regulations relative to the number of boarders in each house as they think proper; and students shall board only at such places as are approved by them.

COLLEGE EXPENSES

Classical School

	One Term	One Year
Tuition,	$25 00	$75 00
Public Room Service (gymnasium, $6.00; library, $3.00; janitor and fuel, $15.00),	8 00	24 00
Elective Course in Biology, extra,	5 00	15 00
Elective Course in Chemistry, extra,	5 00	15 00
Elective Course in Physics, extra,	5 00	15 00
Elective Course in Astronomy, extra,	5 00	15 00
Admission Fee,		5 00
Graduation Fee, payable before senior final examinations,		7 00
Certificate Fee, payable after a special or partial course,		5 00

Scientific School

	One Term	One Year
Tuition,	$25 00	$75 00
Public Room Service (gymnasium, $6.00; library, $3.00; janitor and fuel, $15.00),	8 00	24 00
Draughting-Room Fee, extra after freshman year,	5 00	15 00
Electrical Laboratory Fee, extra,	5 00	15 00
Chemical Laboratory Fee, extra,	10 00	30 00
Ceramic Laboratory Fee, extra,	10 00	30 00
Biological Laboratory Fee, extra,	5 00	15 00
Admission Fee,		5 00
Graduation Fee, payable before senior final examinations,		7 00
Certificate Fee, payable after a special or partial course,		5 00

All College bills are payable within ten days after the beginning of each term. All checks should be made payable to the Treasurer of Rutgers College.

For information in regard to rooms and board in Winants Hall, see subsequent pages.

Students in the Scientific Courses are required to procure sets of draughting instruments, costing from $10 to $20. They are advised to defer the purchase of these instruments until entering College, as they will then have the advantage of procuring them under the direction of the Professor of Graphics.

Students pursuing the Course in Chemistry and the Course in Electricity are expected to provide themselves, at their own ex-

pense, with the necessary sets and pieces of apparatus, which may be obtained from the regular apparatus dealers or from the Laboratory Supplies department. These sets are retained through the year, but at the end of that time, if the owners do not wish to keep them, they will be purchased at a fair price. If proper care has been exercised, a small discount only (about 10 per centum) from the original cost will be made. All breakage and damage to College apparatus will be charged in full.

FELLOWSHIP

Blodgett Fellow in Science.—James H. Blodgett, of Washington, D. C., has given to the Trustees $1200 for the encouragement of advanced study in the Rutgers Scientific School. Whenever the accumulated income from this investment shall amount to $200, that sum is to be paid in quarterly installments to a graduate of Rutgers holding the degree of B.Sc., who shall be selected by a committee appointed by the Faculty and who shall be designated as Blodgett Fellow in Science. The holder of this Fellowship shall prosecute graduate studies in the Scientific School for one year. He shall also render assistance to the professor having the direction of such studies, and for that service shall be exempt from the payment of all fees.

PRIZES

In every case where it is expected that a prize will be awarded for work done, it is distinctly announced that, unless in the opinion of the examiners the work submitted is of such excellence as to merit a prize, or prizes, no prize will be awarded.

Whenever a prize requires both an essay and an examination, the essay must be handed in before the hour fixed for the examination.

All prizes are open equally to members of the Classical and Scientific Schools, except in cases where they are specially limietd to one school by the donor. Each competitor for a prize must sign a written declaration that the essay or other work of-

The Daniel S. Schanck Observatory Rutgers

fered by him is his original and unaided work. The essays are to be written on a paper of a prescribed kind, and the successful essay is to be deposited in the College Library, before the writer is entitled to the prize.

Suydam Prize for Composition

This prize, the gift of James Suydam, is a gold medal of the value of twenty-five dollars, or that sum in money, and is to be awarded to the member of the Senior Class who shall write the best English composition on a subject assigned to the class. Competitors must hand in their compositions on or before 20th April.

Subject for 1905: "Homer."

Suydam Prize in Natural Science

This prize, the gift of James Suydam, is a gold medal of the value of twenty-five dollars, or that sum in money, and is to be awarded to the member of the Senior Class who shall have made the highest attainments in natural science. The examination is upon all the subjects of natural science in the college course—astronomy, biology (including physiology and zoölogy), botany, chemistry, geology and physics—and is conducted by the professors of those subjects. The questions and answers are required to be written.

Bradley Mathematical Prize

This prize was established by the late Honorable Joseph P. Bradley, LL.D., of the Class of 1836, and is maintained by his son, Charles Bradley, of the Class of 1876. It consists of a valuable mathematical work, which is to be bestowed on the student of the Senior Class who shall present the best solution of a set of mathematical problems to be proposed to the class by the Professor of Mathematics before the close of the second term.

Myron W. Smith Memorial Prizes for Declamation

These prizes were founded by Lyndon A. Smith, M.D., of Newark, in the name of his son, Adjutant Myron W. Smith, who was a graduate of the College in the Class of 1858, and who gave his life in the Civil War to the cause of his country. They consist of the interest of $500 (twenty-five dollars), proportionately appropriated to two medals, one of gold and the other of silver, which are to be awarded respectively to the best and second-best speakers of the Sophomore Class. Only those students who have pursued, in the College, the regular studies of the Classical, or a full Scientific Course from the beginning of the freshman year, shall be allowed to contend for these prizes.

The competition for these medals shall take place before a committee of the Faculty, when the best and second-best speakers shall be selected, to whom the medals shall be awarded, and six others shall receive honorable mention in their order of excellence. The medals shall be presented at Commencement.

Tunis Quick Prize in Spelling and in English Grammar

This prize, established by P. Vanderbilt Spader, of New Brunswick, in memory of Tunis Quick, his maternal grandfather, is the income of $300 at 5 per centum, and is to be presented to that member of the Freshman Class, Classical or Scientific, who shall pass the best examination in spelling and English grammar.

The examination is to be conducted in writing by the Professor of English Literature, at as early a day as convenient in the second College term, and under such regulations as the Faculty may from time to time establish.

The prize may be withheld from any and all papers offered, either for want of merit or for failure of proper competition. In case the prize be not awarded in any year, it is to be offered one year later to the members of the same class on the same conditions as at first.

All regulations as to time, manner and conditions of awarding the prize, are subject to change by the Board of Trustees.

Peter Spader Prizes in Modern History.

These prizes, founded by P. Vanderbilt Spader, in memory of his father, Peter Spader, are two in number, the income of $400 and $300, respectively, at 5 per centum, and are to be awarded to those members of the Sophomore Class, Classical or Scientific, who shall present the best essays on some subject in modern history, selected by the Professor of History, with the approval of the Faculty.

The subject is to be announced at the close of the freshman year, and the competing essays are to be handed in on or before the last Monday in May of the sophomore year.

The committee annually appointed by the Faculty may decline to award these prizes, or either of them, for want of merit in the essays, or for failure of proper competition. In case the prizes be not awarded in any year, they are to be offered one year later to the members of the same class on the same conditions as at first.

All regulations as to time, manner and conditions of awarding the prizes, are subject to change by the Board of Trustees.

Subject for 1905: "Prince Henry the Navigator and the Search of the Portuguese for the Indies."

Appleton Memorial Prize in Moral Philosophy

This prize was founded by a gift of $500, from the Reverend Samuel E. Appleton, D.D., in the name of his mother, Mrs. Elizabeth Appleton. It consists of twenty-five dollars, the interest of the above sum, and will be given "to the members of the Senior Class who shall pass the best examination in moral philosophy."

For 1905: (*a*) Examination upon Wundt's *Principles of Morality.*

(*b*) Subject for essay, "The Moral Standard and its Authority."

Bowser Engineering Thesis Prize

This prize was established by Professor Edward A. Bowser, LL.D., in 1875. It consists of mathematical or engineering works of the value of twenty dollars, or that sum in money, and is awarded to that member of the engineering section of the Senior Class in the Scientific School who shall present the best thesis upon some engineering subject at graduation.

John Parker Winner Memorial Prize in Mental Philosophy

This prize consists of twenty-five dollars, given by John Winner, jr., and his wife, in memory of their son, John Parker Winner. It will be open to competition for students in both the Classical and Scientific Schools who are pursuing the study of mental philosophy, and will be bestowed on the one who shall pass the best examination on some work assigned by the Professor of Philosophy.

For 1905: (*a*) Examination upon Stuckenberg's *Introduction to the Study of Philosophy.*

(*b*) Subject for essay (which shall consist of not less than 3000 words), "History, Teachings and Influence of the Sophists."

William H. Van Doren Prize for the Best Essay on Christian Missions

This prize consists of twenty dollars, the gift of the Reverend William H. Van Doren, D.D. It is open to competition for members of the Senior and Junior Classes in both Schools, and for members of the Theological Seminary.

Subject for 1905, essay limited to 3000 words: "The Work of the Society for the Propagation of the Gospel in the American Colonies of Great Britain."

Junior Exhibition

Eight members of the Junior Class in the regular courses are chosen each year, on account of their abilities in composition and in elocution, who deliver original speeches at an exhibition held on the evening preceding Commencement. The selection is made by a committee of three persons appointed for that purpose by the Faculty.

A prize of twenty-five dollars, the gift of Ralph N. Perlee, of New York City, is awarded by a special committee at the time of the exhibition to that orator who shall be adjudged the best writer and speaker among the contestants.

The Bussing Prizes for Extempore Speaking

Mrs. Ann Van Nest Bussing, of New York City, has given to the College $1000, the income of which (fifty dollars per annum) is to be expended each year for books, which shall be selected by the President of the College, and given as follows: the first prize, of thirty dollars, to that member of the Senior Class who shall prove himself to be the best extemporaneous speaker; the second prize, twenty dollars, to the second-best extemporaneous speaker of the Senior Class. The prizes are to be awarded by the Faculty of the College or by a committee whom they shall name, and shall be awarded after a public debate to be held in the latter part of the College year. In awarding the prizes, "strict attention shall be given to logical and forcible presentation of thought, full and accurate information as to matters of fact, and grace and effectiveness in delivery." For the sake of training students in the clear expression of intelligent thought upon matters of public interest, each class has an exercise in extempore speaking twice in each term. The subject is announced to the class, and after five minutes for thought the members of the class discuss the subject or debate the question before a committee.

Van Vechten Prize-essay on Christian Missions

A. V. W. Van Vechten, of New York City, founded in 1884 (first award, Commencement, 1885), in honor of his mother, Mrs. Louisa Van Vechten, and his father, the Reverend Samuel Van Vechten, D.D., a prize of sixty dollars, by the gift of $1000, the prize "to be given annually to that student of Rutgers College who shall be adjudged by the Faculty of the Theological Seminary of the Reformed Church in America, at New Brunswick, to have presented an article original with himself and the best submitted—the most conclusive and inspiriting to strengthen faith in and love for Foreign Missions." The essays are limited to 3000 words, and are to be presented on or before 1st May of each year.

Subject for 1905: "Missions in the Philippines since the American Occupation."

The Class of 1876 Political Philosophy Prize

The Class of 1876 have given the College one thousand dollars ($1000) as the foundation of a prize fund for the encouragement of the study of political philosophy. The income of this fund is to be awarded each year "to that member of the Senior Class (either Classical or Scientific) who shall be adjudged entitled to it, * * * on the basis of an original essay on some subject in political philosophy, assigned by the professor of that science in the College, and upon a competitive examination in a text-book also selected by him;" the committee of award to consist of "three competent persons selected by the Faculty of the College, at least one member of the committee to be a member of the Class of 1876 as long as any may be living."

For 1905: (*a*) Examination upon Willoughby's *The Political Theories of the Ancient World.*

(*b*) Subject for essay, "The Winning of the Louisiana Territory."

Barbour Prizes in Speaking

These prizes, two in number, of the value of fifteen dollars and ten dollars, respectively, are offered by the Instructor in Elocution. The eight members of the Freshman Class of either school in regular course who shall stand highest in elocution during the entire year may compete before a committee appointed by the Faculty.

Scientific Prize in Logic ($50)

Open to Scientific students in full standing only.

For 1905: (*a*) Examination upon Whateley's *Elements of Logic.*

(*b*) Subject for essay, not less than 4000 words, "History, Basis and Limitations of the Theory of Evolution."

HONORABLE MENTION

For the encouragement of independent reading and study and original investigation, under the direction of the Faculty, honorable mention is made of students who give evidence of thoroughness in such work and pass a satisfactory examination. This work is done outside the course and without reference to a prize.

BUILDINGS AND EQUIPMENT

Queen's College.—Erected 1808-1809. This building occupies the central position of the group of College buildings. It contains nine recitation-rooms, a commodious lecture-hall and the offices of the President and of the Registrar.

The Henry Janeway Weston Memorial Collection of books, engravings and curios relating to Napoleon I is deposited

in this building in a room fitted for the uses of the students, particularly those pursuing certain elective courses in history. This valuable collection was given by Mrs. Katherine Weston, who also furnished the room and at her decease left a sum to provide for its maintenance.

The Fine Arts Building.—Erected 1841-1842. The residence of former presidents of the College has been refitted for the uses of the Fine Arts Departmnt of the College, and is known as the Fine Arts Building. It contains the art collections of the College, including "The Thomas L. Janeway, M.D., Memorial Collection" of casts and photographs, and the various gifts of friends of the institution.

The pictures, models, casts and photographs are arranged to represent, as far as possible, the art of the world. A lecture-room having adequate facilities for illustrating lectures by the stereopticon and otherwise, is in use, and the arranging and classifying of the collections is going forward. Acquisitions are being continually made, and every facility for illustrating the history of art is being added to the department. Besides the lectures of the professor in charge, subjects related to the fine arts will be treated from time to time by other lecturers.

The Thomas L. Janeway, M.D., Memorial Collection, to illustrate classical archæology, is the gift of the heirs of Dr. Thomas L. Janeway, of the Class of 1863.

It already includes: (1) Eight casts from marbles typical of the chief periods in the history of sculpture. These casts were manufactured by Brucciani & Co., of London. (2) Five hundred casts from engraved gems (cameos and intaglios) and coins, Greek and Roman. These were so selected as to illustrate the historical development of the art of gem-engraving, especially its best periods. The workmanship on these casts is that of Augustus Ready, of the British Museum. (3) Eight hundred stereopticon slides, of which all but eighty-two were made by the well-known Lévy, of Paris. (4) One thousand photographs and restorations. Among the photographs are Bonfils, of Beirut; Sommer, of Naples; Anderson, of Rome; Mansell, of London;

Lombardi, of London; Quaas, of Berlin; Hautecœur, of Paris.

The collection is designed to illustrate the topography, art, life and literature of Ancient Greece and Rome, and for this purpose is used constantly by College classes.

Van Nest Hall.—Erected in 1845. This building was named for Abraham Van Nest, a liberal trustee, in recognition of his services and gifts to the College.

In 1893 it was beautified by the addition of a stone porch, the gift of Mrs. Ann Van Nest Bussing, daughter of Abraham Van Nest, who at the same time refitted the eastern portion of the second story into a handsome hall for the regular and occasional exercises of the students in elocution.

During the same year the Trustees added a third story to the original building, thus creating a large and well-lighted room for the use of the classes in draughting. On the second floor is another room for the advanced work in graphics.

The rooms of the Peithessophian and Philoclean Literary Societies on the first floor, were thoroughly refitted in 1891, and are for the present devoted to the uses of the Young Men's Christian Association and the Department of the English Language and Literature.

The building also contains the collections for illustrating the instruction given in the engineering courses, comprising a great variety of models showing details of construction in wood, iron and stone, with a full set of Schröder and many Olivier models in descriptive geometry, besides blue prints, working drawings and lithographs of roof and bridge trusses. A complete outfit of engineering and surveying instruments is owned by the College for the use of the students in the surveying classes.

The Daniel S. Schanck Observatory.—Erected in 1865, and named after the donor. This is a two-story brick building with revolving dome, constructed especially for astronomical work. It contains in the main part the equatorial refracting telescope, mounted on a pier of solid masonry extending several feet below the surface of the ground and detached from the floors, through which it rises, in order that it may be unaffected by the

tremors of the building. The telescope is eight feet four inches in focal length, with an aperture of six and one-half inches, and was made by Henry Fitz, of New York. It has a small telescope attached for a finder, a driving-clock, a position-micrometer, a number of eye-pieces of various powers, ranging from 50 to 600, and a solar attachment for the study of sun-spots. The declination circle is ten inches in diameter, reading by verniers to one minute of arc, and the hour circle, seven and one-half inches in diameter, reads by verniers to six seconds of time.

On the west side of the main part is an extension for transit observations. The meridan circle used for this work was made by Stackpole, of New York, and has an object-glass four inches in diameter and four feet ten inches in focal length, with circles seventeen inches in diameter, reading by two microscopes with micrometer screws to single seconds of arc. The diaphragm carries one horizontal and seven vertical wires. There is also a striding spirit-level and an apparatus for reversing the axis of the instrument. The bearings rest on two stone pillars supported by piers of masonry.

The Observatory has also a sidereal clock, by Wm. Bond & Son, the gift of John Clark, of New Brunswick, with an electrical break-circuit; a mean solar clock, the gift of the Peithessophian Society of Rutgers College; and a reflecting-circle, the gift of the Philoclean Society of Rutgers College, and several barometers and thermometers.

The whole building and the instruments are illuminated by the electric light. The Observatory is used in connection with the course in general astronomy to give a knowledge of the sun, moon, planets, etc. Those who elect mathematics and astronomy receive instruction in the use of the instruments and take part in the observations. Graduate students can take a still more extended course.

The longitude of the observatory is $0^h\ 10^m\ 29^s$ east of the New Naval Observatory, Washington, D. C.

The latitude is 40° 29′ 58″ N.

Geological Hall.—Erected in 1871. This building is occupied by the Departments of Physics and of Geology and Mineralogy.

Department of Physics.—This occupies seven rooms on the main floor and three in the basement. There are two lecture-rooms, an apparatus-room, a general laboratory, a laboratory for work requiring even temperature, a battery-room, and an office.

The lecture apparatus comprises the usual instruments. The laboratories contain general apparatus, such as dividing engine, a set of United States standard weights and measures, metric standards, spherometer, plainimeter, etc. Among the special apparatus are a steam-engine, a gas-engine, electric motors of various patterns, a storage-battery, a model Edison three-wire plant of about two hundred lights capacity, a full set of electrometers, galvanometers, and rheostats. The reference-books most frequently consulted are kept in the rooms of the department, ready for instant use.

Department of Geology and Mineralogy.—The rest of the building is occupied by this department. It consists of a class-room, a laboratory for determinative mineralogy, and an exhibition-room 40 by 84 feet with a gallery, containing the Geological Museum and collections. The class-room and laboratory occupy the second and third floors, respectively, at the front of the building, and open directly into the museum, thus greatly facilitating the use of the collections in class instruction. The laboratory is supplied with water and gas connections, the usual apparatus and reagents, and abundant material for studying the properties of minerals and for practice in determining unknown specimens. The department is also supplied with a large assortment of glass and wood models for the study of crystallography, a modern petrographic microscope and a library of the most important text and reference books in geology and allied sciences.

The Geological Department of the College Library receives all publications of the State and United States geological surveys, besides many similar publications of other States and several of the leading periodicals relating to geology, mineralogy and mining. This department of the Library has been greatly strengthened by the addition of the valuable scientific library of the late Professor Chester, which has been presented to the College by his son, Albert H. Chester.

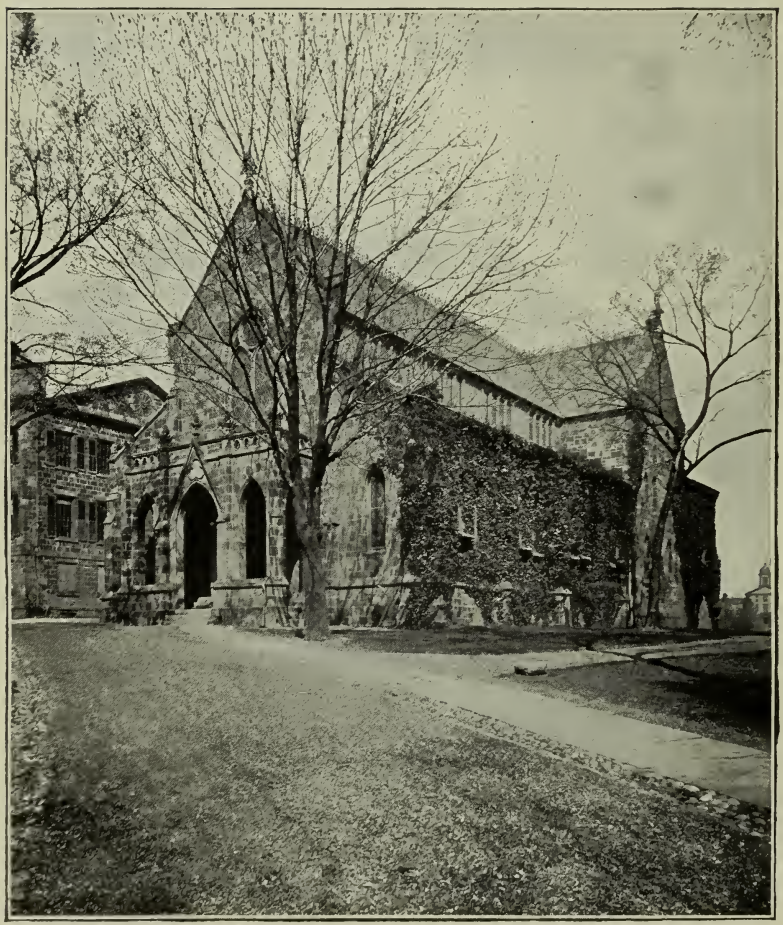
The Geological Museum contains about 30,000 classified and labeled specimens, of which the following collections are the most important:

1. The Cook systematic collection of minerals, containing about 5,000 specimens.
2. The Beck collection of minerals—3,000 specimens—collected by Dr. Lewis C. Beck, chiefly in New York, between 1820 and 1850.
3. The Chester collection of minerals, containing about 5,000 specimens, formerly belonged to the late Professor Albert H. Chester. This has been presented to the College by his son, Albert H. Chester. It is particularly rich in perfect, typical specimens, and hence is of great value for teaching purposes.
4. The Geological Survey collection of over 900 specimens of rocks, minerals and ores of New Jersey, collected between 1860 and 1880, and representing all parts of the State.
5. A lithological and structural collection of over 1,500 specimens.
6. The "Educational Series" of 156 typical American rocks, prepared and presented by the United States Geological Survey.
7. The paleontological collection, containing 6,000 specimens of fossils, arranged according to their geological horizon.
8. A magnificent mounted specimen of Mastodon from Mannington, New Jersey, which has been set up through the liberality of the Honorable Henry W. Bookstaver.
9. A slab of Triassic sandstone, 8 by 18 feet, from Morris county, showing footprints of fifteen dinosaurs and one marsupialoid.
10. Miscellaneous small collections, including a number of large single specimens of considerable value.

In addition to the strictly mineralogical and geological collections, there is valuable illustrative material in several related sciences. Most notable are the following:

11. The Frazee collection of paleolithic and neolithic implements, ornaments, etc., containing 1,700 specimens, presented by the Reverend John Hatfield Frazee.
12. A conchological collection, containing over 1,600 specimens of recent shells.
13. The Cuthbert botanical collection, containing a great number of specimens of native and foreign plants.
14. Various large single specimens, including the largest known specimen of the Japanese spider crab (*Macrocheirus camperi*), which has a span of eleven feet, and the skeleton of a right whale, forty-two feet long, which was caught in the Raritan river.

These collections have been systematically arranged and labeled, with great labor and painstaking care, and nearly all are on exhibition in glass cases.



Kirkpatrick Chapel Rutgers

Donations of collections or individual specimens that illustrate any phase of geology, mineralogy, or paleontology are solicited from friends of the College. Ores and other valuable minerals, and the products and by-products of their manufacture, are also specially desired for illustrations in economic geology.

The Kirkpatrick Chapel.—Erected in 1872 with money bequeathed to the College by Mrs. Sophia A. Kirkpatrick. This building is of brownstone, in the French Gothic style of the fourteenth century. The auditorium is attractive, having a roof of open timber, finished in black walnut and stained pine. On the walls hang numerous portraits of former officers and benefactors of the institution. It has a seating capacity of 350 persons.

Back of the Chapel is a large room designed for the President's classes, and adjoining is the assembly-room for the Trustees.

The Ralph Voorhees Library.—Erected 1902–1903. This building is the gift of Ralph Voorhees, of Clinton, N. J.

Its exterior reflects the spirit of Queen's College, the Long Meadow (Mass.) stone, of a reddish-brown tone having been chosen for the outer walls, that they might accord as far as possible with the color of the stone used in Queen's. The basement and first floors are thoroughly fireproof, and the rest of the building practically so, the walls and ceilings being either of brick or of plaster on wire lath supported on iron frames. The building contains but few fixed interior walls and, therefore, offers no obstruction to the development of the library. The stack-rooms may be increased indefinitely toward the north, and the reading-rooms to the east and west, without materially affecting the design. The building will accommodate at present more than 100,000 volumes, some 50,000 of which can be placed on the main floor. Small study-rooms will be formed on each story of the stack-rooms.

Access to the Library is had from two doorways. Passing through lobbies, the entrance is direct into a rotunda thirty-seven feet in diameter, with a low dome and lighted by a large central

skylight. Opening directly out of this rotunda, east and west, are two reading-rooms, twenty-five by twenty-eight feet each, with elliptical barrel-vault ceilings and lighted on three sides by large windows above bookcases, which extend around three sides of each room. The Librarian's room and a cataloguing-room are on the front of the first story. Over these are a room for the President and Trustees, and a lecture-room. A large fireproof vault is provided in the basement. The building is heated and ventilated by a steam indirect-radiation system with auxiliary direct heating as may be required.

The Library contains 46,859 volumes and receives 150 current periodicals; it is open for consultation during each weekday from 8 A. M. to 4.30 P. M.

Students are allowed free access to the books, and are encouraged to become familiar with the proper methods of using a library for literary work.

In 1887 P. Vanderbilt Spader, of New Brunswick (a member of the Class of 1849), gave to the College his personal library, valued at $15,000, and consisting of about 5000 books, among them many very valuable art volumes, and collections especially rich in State and local history, and books of reference. By his will the College has received $10,000, the income of which is to be expended for the maintenance and increase of the P. Vanderbilt Spader Library Gift.

By the gift of a permanent fund of $1000 from James Suydam, supplemented by gifts from other sources, the library is supplied with the leading periodical publications in the various departments.

The Sage Library.—Through the courtesy of the Theological Seminary of the Reformed Church, the Sage Library, containing 46,629 volumes and 8561 pamphlets, is open to the students of Rutgers College for consultation; and under certain limitations books may be drawn from it. It is within four minutes' walk of the College campus.

The State Laboratory of the New Jersey Agricultural Experiment Station.—The erection of this building was authorized by an act of the Legislature approved 23d April, 1888. It affords accommodations for the uses of the State and Agricul-

tural College Stations, and by the courtesy of the Board of Managers of the State Station, who also constitute the State Board of Visitors to the Agricultural College, for the laboratory and classroom work of the students of the Agricultural College who are pursuing the regular and special courses in agriculture, chemistry and biology.

Equipment of the Department of Agriculture and Biology.—These departments, including botany, entomology and zoölogy, have an equipment for purposes of instruction, consisting of the following:

(*a*) College Farm.—This is equipped with modern farm buildings and arrangements, improved farm implements, including corn-harvesters, potato-diggers, seed-planters, engine and boiler, cutters and crushers for fodder, hay-loaders and mowers. The dairy is equipped with the leading cream-separators, milk-coolers and bottles, Babcock tester, etc.

A poultry-house has recently been erected, which is provided with incubators and adequate facilities for experiments in the breeding and care of fowls.

In the early summer of 1895 an irrigation plant was placed upon the farm, designed to supply the water needed by vegetables and fruits on at least ten acres.

The barns and other buildings are modern in their construction, and serve as models of convenience and in economy of space. The equipment is of the most modern type, including all of the necessary tools and implements required for farm practice. The live stock includes representatives of the leading breeds of horses, dairy cattle, swine and poultry. The intensive system is practiced; it includes soiling, green manuring, and all the natural and artificial aids necessary in continuous cropping to secure maximum yields. A special study is made of forage crops for the dairy, and all the leading crops in this group are grown.

The Farm is, on the whole, an object-lesson, not only in modern and profitable practice, but in showing the economical manufacture of crude crop material into high-class products, as milk and

cream, for which all the modern appliances are used. Business methods are observed throughout.

On the experimental areas, the leading varieties of fruits, berries and vegetables are grown, and scientific methods of fertilizing, manuring and cultivating are used. The plant-houses also afford opportunity for a study of forcing methods.

Models of farm buildings, illustrating the best methods of construction, besides those illustrating various interior arrangements, as stalls for horses and cattle, are available for instruction.

(*b*) Laboratories.—Separate rooms for botany, for entomology and for zoölogy have been equipped with tables, accessory microscopic apparatus, histological reagents, microtomes, material for dissection, eighteen compound microscopes (Reichert's, Leitz's, and Bausch and Lomb's), giving powers up to 800 diameters; also with many dissecting microscopes.

(*c*) Auzoux Models, illustrating the structure of man, cow, bird, reptile, fish, snail, starfish, ascidian, medusa, worm, insects (cockchafer, silkworm larva and moth, honey-bee and its work) and plants (various flowers, fruits and fungi).

(*d*) Charts (including many of Leuckart's), illustrating the various parts of the living world; also many photographs and lantern slides.

(*e*) Cabinets: a collection of slides illustrating histology and the anatomy of minute animals, especially the insects; a collection of 5000 species of insects systematically arranged; also a collection of nearly 25,000 plants.

(*f*) Museums: a collection of stuffed animals and alcoholic specimens systematically arranged, sixty large boxes containing a collection of injurious insects and examples of their work, a systematic collection of over 5000 species of American insects, preparations of pathological plant specimens, a collection illustrating the biology of the oyster, its messmate and enemies, and a fine, systematic collection in conchology.

(*g*) Besides this equipment for direct instruction, the student has brought under his observation the equipment of the research laboratories of the experiment stations in working operation, such as the instruments used in the study of milk, soils, fertili-

zers, bacteria, mycology, micro-photography, insecticides, fungicides, and in other experiments relating to agriculture.

The facilities for teaching chemistry are fully equal to the demands. The two laboratories furnish abundant room to the students, and are equipped with filter-pump, water-blasts and tables for organic analyses, besides the ordinary facilities found in all laboratories. An adjoining room has been fitted up as a department library, in which are standard works of reference and the important chemical journals on file. The students are encouraged to spend all spare time in this room. The lecture-room is abundantly lighted and the table well fitted for experimental lectures. Special pieces of apparatus are constantly acquired, particularly to illustrate the more difficult points in the new developments of chemistry, and for investigation. The collection to illustrate the lectures on applied chemistry is growing. Contributions are earnestly solicited.

Ceramics Building.—Erected in 1902. The equipment is housed in a commodious laboratory especially adapted and arranged for the purpose. This building is located on College property adjacent to the campus. The front of the main portion is of the Colonial style, plainly but well executed in buff brick.

The workshop contains nearly 1700 square feet of floor space, which provides an admirable place for the machinery installed. Here is located the 30 h.p. electric motor. The power is distributed by two lines of shafting furnished with split steel pulleys.

The brick-making outfit consists of an auger brick-machine of a capacity of 20,000 brick a day, a horizontal pug-mill and a down-cut-board delivery-table. Appliances for the potter and the tile-maker also find a place in this shop. The machinery for that purpose consists in part of the following articles: A dry pan or grog-mill arranged for wet and dry grinding, a clay-mixing and preparing machine or a combined blunger, agitator, lawn-screen, filter-press and slip-pump, with a capacity of 500 to 1000 pounds a day, a four-jar glaze-mill, a large-size ball-mill a combination pull-down and jigger combined, a thrower's wheel, a potter's pug-mill, a wad-machine, a hand-jigger, sieving machinery, a tile-press and other necessary appliances, all of the latest

design and representative of the chief types in the manufacture of a wide range of wares.

In an adjacent room is a wet closet built of porous brick with a terra cotta lumber ceiling. The outside is covered with a coat of cement. In this room may be stored unfinished clay wares, which may be kept damp for a long period.

A kiln has been provided which is sufficiently large to hold a quantity of wares of various sorts. It is so constructed as to be used either as an up-draught or a down-draught, thus representing the two chief types. Frit furnaces and an improved Seger furnace are also at hand. A Le Chatelier pyrometer and Seger cones have been purchased for use in study of the phenomena associated with high temperatures.

In an upper room is placed an extensive library containing the most important literature on clays and clay-working. This literature represents the best thought of French, German, English and American investigators.

A collection of ceramic wares is in process of installation. Suitable cabinets have been arranged for containing this collection.

Inasmuch as this department is required to perform the two-fold function of a school for instruction and a laboratory for investigation, a room has been set apart for the use of the Director. It is furnished with the usual fixtures and scientific apparatus.

Winants Hall, Dormitory.—Erected in 1890. This building was given to the College by Garrett Ellis Winants, a staunch friend and trustee of the institution. It serves as a dormitory and refectory for such students as choose to lodge and board at the College. It accommodates 100 students. The rooms are arranged in suites of a study and two sleeping-rooms for two and three room-mates, and there are a few single rooms. Special attention is given to light, ventilation and sanitary appliances, and to the necessary quite retirement and privacy of the students.

Ample provision is made of fire-escapes and other securities against accidents.

The entire building is heated by steam. Bathrooms, lavatories and storerooms are on each floor.

The large study-rooms are each furnished with two study-tables and two chairs. The bedrooms are each furnished with a solid-oak set, consisting of bedstead (springs and mattress), bureau and washstand. The remaining furniture, such as sheets, pillows, pillow-cases, coverlets, towels, bowl and pitcher, etc., are to be supplied by the occupant. The schedule of prices for single rooms and suites of rooms includes heat and gaslight.

In drawing for choice of rooms, the order of classes will be followed, precedence being given to the Seniors.

Rooms are to be taken for the full year. Rent is payable in advance, one-third at the beginning of each term. Agreement to pay rent is for the entire suite, and must be signed by the student who draws it, or his guardian. Rooms may be occupied from the Monday preceding the opening of the College year to the Saturday following Commencement.

During the present year board is furnished by the matron at $3.50 a week.

The drawing for choice of rooms for the year 1905-1906 will take place in the Registrar's office on Wednesday, June 7, 1905, at 2.30 P. M.

Schedule of Prices a Week of Rooms in Winants Hall for 1905–1906

The following schedule gives the weekly rental for each occupant of the respective rooms, and no more may occupy any suite than is indicated in parentheses after the room numbers. One student occupying a double room, or two students occupying a room intended for three, will be charged the full rental for the suite.

$1.00—11 (1), 15 (1), 16 (1), South, First Floor. 116 (1), 117 (1), 121 (3), North; 127 (3), South, Fourth Floor.

$1.25—5 (3), North; 9 (2), 20 (2), South, First Floor. 118 (2), North; 132 (2), 135 (1), 136 (1), 137 (2), South, Fourth Floor.

$1.50—70 (3), 76 (1), 77 (1), 81 (3), North; 102 (3), 113 (3), South, Third Floor.

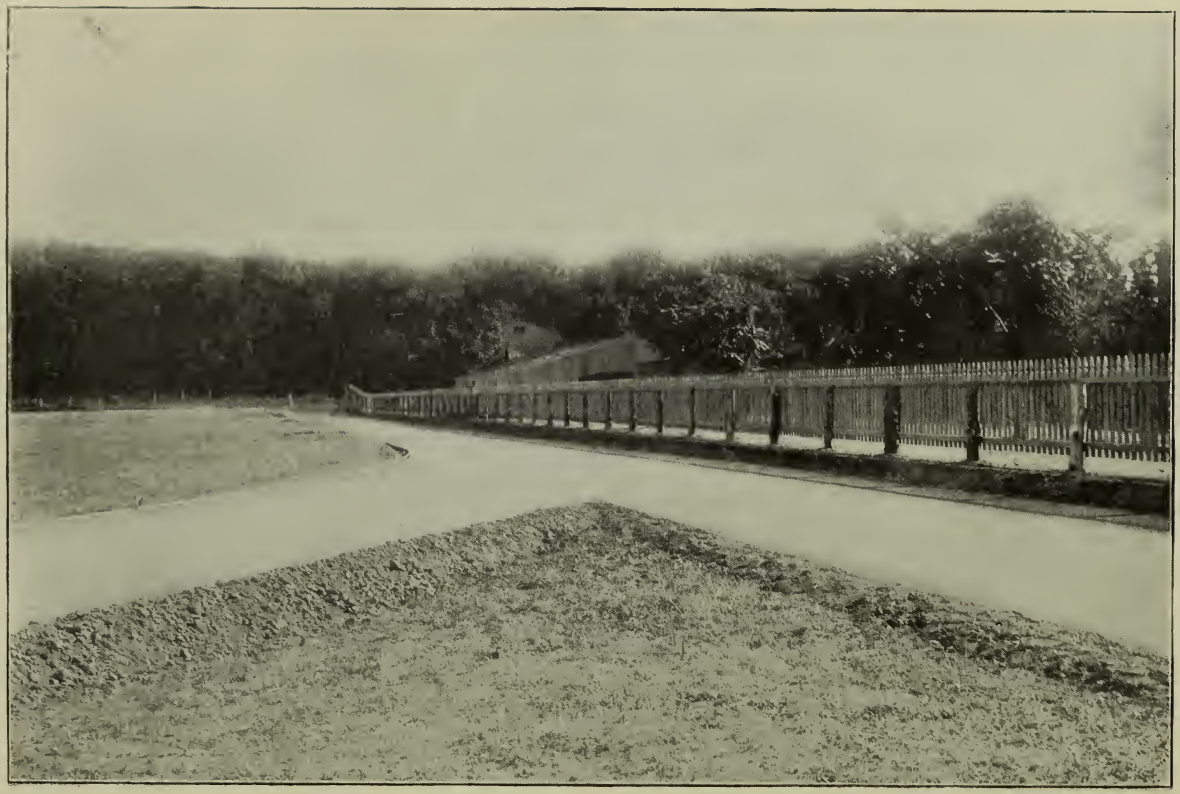
$1.75—23 (3), 29 (1), 30 (1), 34 (3), North; 55 (3), 66 (3), South, Second Floor. 108 (1), 109 (1), South, Third Floor. 124 (2), Middle; 140 (1), North, Fourth Floor.

$2.00—61 (1), 62 (1), South, Second Floor. 87 (2), 90 (2), 96 (2), 97 (1), 99 (1), Middle, Third Floor.
$2.25—2 (2), North; 12 (2), 17 (2), South, First Floor. 40 (2), 43 (2), Middle, Second Floor. 73 (2), 78 (2), North; 105 (2), 110 (2), South, Third Floor.
$2.50—26 (2), 31 (2), North; 58 (2), 63 (2), South, Second Floor.

It will be seen from the foregoing statements and schedule that board, lodging, heat and light may be had in Winants Hall at a cost varying from $4.50 to $6.00 a week.

The Robert F. Ballantine Gymnasium.—By the generosity of Robert F. Ballantine, of Newark, N. J., a trustee of the College, a building was completed in 1894 which affords unexcelled opportunities for physical instruction and exercise, and for military instruction and drill. This gymnasium is situated on spacious grounds given to the College by another trustee, James Neilson, of New Brunswick. The building is in two parts, the front portion being devoted to purposes of administration, and the rear, the gymnasium and drill-room proper. Ample offices are provided for the instructor in military science and the instructor in physical culture. The gymnasium and drill-room combined afford an unobstructed space one hundred feet by sixty in dimensions. The apparatus is of the most approved kind. Suspended from the truss roof is a running-track two hundred and eighty feet in length. Space is also afforded for the armory of the Scientific School. On the one side of the administration building is a large room for lockers, on the other side a roof for military equipments. On the floor above, apartments are provided suitable for all the uses incident to these purposes. In the basement are a swimming-tank, shower and needle-baths, a ball-cage, and four bowling alleys of perfect construction.

The building is a fine specimen of the Colonial style of architecture.



The Running Track Rutgers

ATHLETICS

In order to secure for the students the benefits of out-of-door exercise, athletic sports are encouraged by the provision of adequate facilities. Rightly controlled, such sports have shown themselves beneficial both to the health of the students and to the quality of the work done, and are manifestly in the interest of good order. The more prominent athletes have been generally among the more earnest and successful students. The proper control of athletics has been secured by the organization of an incorporated Athletic Association, supported by the students and controlled by a board of nine Trustees, chiefly composed of resident alumni. In this board the Faculty has always had one or more representatives. Details in the conduct of athletics are in charge of a Board of Managers, which meets once a month during the College year. This board is composed of a representative of the Faculty, three alumni, three undergraduates, together with the President and Treasurer of the Association, the Chairman of the Board of Trustees and, ex officio, the Physical Director of the College. In this way a cordial coöperation has been steadily maintained between Faculty and students, avoiding the need for the exercise of direct authority.

The Athletic Field.—By the generosity of James Neilson, of New Brunswick, an alumnus and trustee of the College, there has been provided an athletic field, containing more than five acres and at a walking distance of about eight minutes from the College campus.

About eight thousand dollars have been spent in improving this field and providing proper accommodations. It is furnished with a commodious grandstand, with dressing-rooms and bath-rooms attached, and with everything to make it as nearly perfect as possible and to render it practically useful to the students.

A new quarter-mile running track has been constructed after the best models, new and additional bleachers have been erected, and the inner field has been separated from the space allotted to spectators by a picket fence, running along one side of the field.

The Boathouse.—With funds secured from the undergraduates, alumni and friends of the College, a commodious boathouse has been built, conveniently situated for the use of those interested in boating.

REGISTER

1 SOPHOMORE ORATORS, CLASS OF 1906

In the order of their appointment according to merit

Maurice Irving Lindrith Kain
Harry William Noble
Raymond Berguer Johnson
J Harvey Murphy
Louis Bevier, 3d
Percy Edgar Brown
Henry Marshall Fales, jr.
Thomas Alan Devan

2 JUNIOR ORATORS, CLASS OF 1905

Junior Exhibition, June 21st, 1904

Harry Baremore Angus
Welcome William Bender
Simon Blocker
James Howard Brinckerhoff
Robert Weeks Cobb
Herman Terhune Hopper
Albert Leeds Stillman
Charles Parker Wilber

3 GRADUATING EXERCISES, CLASS OF 1904

Commencement, June 22d, 1904

Henry Dyer Cook, ...Milwood, N. Y.
Third Classical Honor

* Martin Luther Schenck, ...New Brunswick, N. J.
Second Classical Honor

William Kenneth Flanagan, ...New Brunswick, N. J.
Oration

Martin Luther Schenck, ...New Brunswick, N. J.
Rhetorical Honor

Emil Eisenhardt Fischer, ...Elizabeth, N. J.
Oration

Louis Williamson Conover, ...New Brunswick, N. J.
First Classical Honor

Richard Heuser, ...Matawan, N. J.
Third Scientific Honor

Charles Wagner, ...Elizabeth, N. J.
Second Scientific Honor

Frederic Alton Price, jr., ...Elizabeth, N. J.
First Scientific Honor

Daniel Frederick Burnett, ...Newark, N. J.
Master's Oration

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* Excused on account of delivering the Rhetorical Honor Oration

4 HONORS IN SPECIAL SUBJECTS

In Latin, ... Louis Williamson Conover
In Greek, ... Louis Williamson Conover
In Mathematics (Classical), ... Henry Dyer Cook
In Mathematics (Scientific), ... Richard Heuser

5 DEGREES CONFERRED

Degree of Bachelor of Arts Conferred on Candidates in Course

Arthur Le Grand Berger
Charles Robert Blunt
Louis Williamson Conover
Henry Dyer Cook
John Norris Field
Emil Eisenhardt Fischer
William Kenneth Flanagan
William Hobart Giebel
Charles William Lambert
John Alexander Linnett
Martin Luther Schenck
William Henry Stewart, jr.
Louis Frederic Wolf

Degree of Bachelor of Science Conferred on Candidates in Course

George Wolfe Bauer
Fred Le Roy Brown
William James Douglas, jr.
Gardner Sam Driver
Stephen Clifton Garrison
Frederick William Gaston
George Henry Gowen
Richard Heuser
Alfred Ellet Hitchner
Harry Jay Howell
Milton Shortlidge Ley
Charles Bernard Lipman
John Mellor
Ridgway Fell Moon
Herbert Wills Moore
Frank Abram Morris
George Andrew Mount
John Irving Nelson
Charles Francis O'Neill
Harold Blackman Osborn
Herman Arthur Plusch
Frederic Alton Price, jr.
Warner Risley
Bertram Frothingham Shivler
Whitelaw Reid Stryker
Thomas Earle Van Winkle
Frederick George Carl Volkert
Charles Wagner
Fritz Carl Wittig
Frank Carrington Woodruff
Lewis Maxwell Young

Degree of Master of Arts Conferred

Robert Anderson Cooke, '00
George W. Gulick, '01
Frank Martin Hummel, '01
Alexander Farrel Johnson, '01
Conrad Orton Milliken, '01
Alonzo Ranson, '01
William Ewell Simpson, '01
Henry Salmon van Woert, '01

Degree of Master of Science Conferred

James Edward Ashmead, '97
Raymond Van Arsdale Carpenter, '97
Corydon Mott Ryno, '98
John Francis Tinsley, '00
Daniel Frederick Burnett, '01
James Lloyd Garabrant, .01
William Palmer Patterson, '01

Degree of Bachelor of Divinity Conferred

George W. Gulick

Honorary Degrees Conferred

D.D.	Reverend William Pierson Merrill	Chicago, Ill.
D.D.	Reverend Alfred Howard Demarest	Catskill, N. Y.
D.D.	Reverend Asher Anderson	Boston, Mass.
LL.D.	Richard Vliet Lindabury	Newark, N. J.

6 PRIZES AWARDED

SENIOR PRIZES

Suydam Prize for Composition		Charles Wagner
Brodhead Classical Prize		Louis Williamson Conover
Bradley Mathematical Prize		Richard Heuser
Appleton Memorial Prize in Moral Philosophy	First	Henry Dyer Cook
	Second	Louis Williamson Conover
Bowser Engineering Thesis Prize		Warner Risley
Bussing Prizes for Extempore Speaking	First	Emil Eisenhardt Fischer
	Second	Martin Luther Schenck
Class of 1876 Political Philosophy Prize		Charles Wagner
Bradley Prize in Roman Law		Louis Williamson Conover
Luther Laflin Memorial Prizes in Metaphysics	First	Henry Dyer Cook
	Second	Arthur Le Grand Berger
Classical Prize in Logic		Louis Williamson Conover

JUNIOR PRIZE

Ralph N. Perlee Junior Orator Prize		Simon Blocker

SOPHOMORE PRIZES

Myron W. Smith Memorial Prizes for Declamation	First	Maurice Irving Lindrith Kain
	Second	Harry William Noble
Peter Spader Prizes in Modern History	First	J Harvey Murphy
	Second	Maurice Irving Lindrith Kain

FRESHMAN PRIZES

Tunis Quick English Grammar and Spelling Prize		George Allen Leukel
Sloan Classical Entrance Examination Prizes	First	Solomon Esberg
	Second	George Allen Leukel
Barbour Prizes in Speaking	First	Ralph Decker Van Duzer
	Second	Alex William Quackenboss

GENERAL PRIZES

Van Doren Mission Essay Prize ..... Henry John Vyverberg
Van Vechten Prize for Essay on Foreign Missions ..... Simon Blocker

7 RUTGERS CORPS CADETS

COMMANDANT

CAPTAIN S. E. SMILEY
Fifteenth U. S. Infantry

FIELD AND STAFF

Cadet Major—C. A. Morris
Cadet Captain and Adjutant—D. T. Mason
Cadet First Lieutenant, Quartermaster and Commissary—D. C. Roberts

NON-COMMISSIONED STAFF

Cadet Sergeant-Major—H. M. Fales, jr.
Cadet Quartermaster and Commissary Sergeant—T. H. Bruce

Company A	*Company B*	*Company C*	*Company D*
CADET CAPTAINS			
F. E. Holsten	A. V. DeHart	G. R. Koehler	H. B. Angus
CADET FIRST LIEUTENANTS			
W. B. Roll	I. R. Valentine	G. B. Ford	E. J. Davis
CADET SECOND LIEUTENANTS			
E. W. Seng	R. W. Cobb	B. A. Sickles	F. R. Mason

CADET FIRST SERGEANTS

Company A	*Company B*	*Company C*	*Company D*
H. K. Doane	C. S. Brinkerhoff	T. A. Devan	F. O. Mittag, jr.

CADET SERGEANTS

W. H. Benedict, jr.	F. N. Wardwell	R. W. Allen	E. H. Acton
A. G. Ahrens	J. E. Morrow	G. G. Ashwell	A. W. Hill

CADET CORPORALS

W. R. Hughes, jr.	L. A. Heath	T. R. Varick	T. D. Halliwell, jr.
A. P Swan	R. D. Van Duzer	V. D. Tompkins	L. Esselstyn
R. P. Wilson			H. A. Marmer

COLOR GUARD

Cadet Color Sergeant, A. Brogger

FIELD MUSIC

Cadet Drum Major, J. E. Pearce
Cadet Chief Musician, A. B. Smith
Cadet Principal Musician, F. B. Kurtz
Cadet Sergeant, N. S. Moore

DISTINGUISHED STUDENTS IN THE MILITARY DEPARTMENT.

The orders of the War Department provide that on the graduation of every class the names of the three most distinguished students in military science and tactics shall be inserted in the United States Army register; and that the names of such students as have shown special aptitude for military service shall be reported to the Military Secretary of the United States Army and to the Adjutant General of the State of New Jersey.

The names of the three students in the Class of 1904 that will appear in the Army register for 1904, are:

Cadet Captain—Frederic Alton Price, jr.
Cadet Major—Thomas Earle Van Winkle
Cadet Second Lieutenant—George Andrew Mount

The names of the students in the Class of 1904 reported as having shown special aptitude for military service, are:

Cadet Captain—Frederic Alton Price, jr.
Cadet Major—Thomas Earle Van Winkle
Cadet Second Lieutenant—George Andrew Mount
Cadet Captain—John Brien Brown
Cadet First Lieutenant and Adjutant—Harold Blackman Osborn

8 STANDING COMMITTEES OF THE BOARD OF TRUSTEES

The President is ex officio a member of all committees

Finance—Robert F. Ballantine, Esq., Chairman
Instruction and Discipline—Rev. Edward B. Coe, D.D., LL.D., Chairman
College Experiment Station—The President, Chairman
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Beneficiary Trusts—Rev. Professor J. Preston Searle, D.D., Chairman
Advisory—The President, Chairman
Ceramic Department—William H. Leupp, Esq., Chairman

9 STANDING COMMITTEES OF THE FACULTY

The President is ex officio a member of all committees

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Athletics—Professor Bevier, Mr. Dodge, Captain Smiley
Catalogue—Professors Davis, Breazeale, Mr. de Regt
Curriculum—Professors Kirk, Payson, Speyers
Employment of Students—Professors Titsworth, Smith, Mr. Upson
Extension Work—Professors Smith, Bevier, Mr. Parmelee
Graduate Degrees—Professors Van Dyck, Nelson, Mr. Thompson
Gymnasium—Professor Bevier, Mr. Dodge, Captain Smiley
Library—Mr. Upson, Professors Hart, Lewis
Music—Professor Davis, Messrs. Babbitt, George
Relations to Preparatory Schools—Professors Stevenson, Bevier, Payson
Press—Professors Voorhees, Davis, Mr. Barbour

10 STUDENT SELF-GOVERNMENT COMMITTEE, 1904–1905

Dean F. C. Van Dyck, ex officio.

Welccome W. Bender '05	Harry M. Brown '06
Francis B. Kurtz '05	Norbury C. Murray '06
Charles A. Morris '05	George H. Roeder '06
Elmer S. Weaver '05	Louis F. B. Woolston '06
Alton P Swan '07	Harry T. Brewer '08
Vinton D. Tompkins '07	Rudolph F. Steinke '08

11 THE ASSOCIATION OF THE ALUMNI OF RUTGERS COLLEGE

President	John N. Carpender '66
Vice Presidents	Hon. William H. Vredenburgh '59 Rev. William E. Griffis '69 Hon. Louis H. Schenck '74 Hon. M. Linn Bruce '84
Secretary	W. Edwin Florance '85
Treasurer	Irving S. Upson '81
Orator Primarius	Professor Edward A. Bowser, LL.D., '68
Orator Secundus	Philip M. Brett '92
Biographer	Rev. William H. S. Demarest, D.D., '83
Alumni Trustee Nominating Committee	Henry A. Neilson '73 Rev. Joseph R. Duryee, D.D., '74 Myron T. Scudder '82
Chief Inspector of Election of Alumni Trustee	Professor A. A. Titsworth, C.E., '77
Assistant Inspectors	Irving Hoagland '90 Howard V. Waldron '93
Chairman of the Standing Committee	Professor Louis Bevier, jr., Ph.D., '78

Standing Committee

John N. Carpender '66, President ex officio
W. Edwin Florance '85, Secretary ex officio
Irving S. Upson '81, Treasurer ex officio

	Term Expires
Jacob E. Ward '75	June, 1905
Theodore Strong '83	June, 1905
H. A. Smith '87	June, 1905
Rev. John H. Raven, D.D., '91	June, 1905
Charles Bradley '76	June, 1906
Prof. A. A. Titsworth, C.E., '77	June, 1906
Rev. Wm. S. Cranmer, D.D., '82	June, 1906
Maurice J. Thompson '89	June, 1906
Theodore B. Booraem '81	June, 1907
Robert B. Littell '95	June, 1907
Charles A. Runk '74	June, 1907
Rev. Clifford P. Case '97	June, 1907

12 THE RUTGERS COLLEGE ALUMNI ASSOCIATION OF THE CITY OF NEW YORK

Organized 1892 Incorporated 1902 Annual meeting January 20, 1905

OFFICERS

President ..... John A. Miller '71
Vice President .....*Clifford H. Strang '91
Secretary ..... Philip M. Brett '92
Treasurer ..... Frank A. Pattison '87

DIRECTORS

For One Year

Hon. Henry W. Bookstaver '59 — Louis W. Stotesbury '90
William S. Myers '89

For Two Years

Professor Louis Bevier, jr., 78 — Warren A. Mayou '90

13 RUTGERS CLUB, 1904–1905

Dinner Committee .....
- Myron T. Scudder '82, Presiding Officer
- Rev. William H. Ten Eyck, D.D., '45
- Richard Wynkoop '49
- Rev. Joachim Elmendorf, D.D., '50
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- Judge William H. Vredenburgh '59
- J. C. Pumpelly '60
- Stephen Fiske '62
- Judge Alfred Reed, LL.D., '62
- Rev. Charles H. Pool, D.D., '63
- Augustus Floyd '65
- John N. Carpender 66
- Haley Fiske '71
- Charles A. Runk '74
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- Rev. Henry E. Cobb, D.D., '84
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- William S. Myers, F.C.S., '89
- Dr. James Bishop '91
- Philip M. Brett '92
- Rev. Ellis Bishop '92
- Dr. Louis F. Bishop '85, Secretary and Treasurer, 54 West Fifty-fifth street, New York

* Died August 30th, 1903.

Specimen Entrance Examination Papers

ALGEBRA

1 Resolve into two factors $x^4 - 19x^2y^2 + 25y^4$.

2 Add $\frac{x^2 + y^2}{xy} - \frac{x^2}{xy + y^2} - \frac{y^2}{x^2 + xy}$.

3 Given $\frac{2x + 3a}{x + a} = \frac{2(3x + 2a)}{3x + a}$ to find x.

4 Given $\sqrt{x} - \sqrt{x - 8} = \frac{2}{\sqrt{x - 8}}$ to find x.

5 Given $x - y = 3$, $x^2 - 3xy + y^2 + 19 = 0$ to find x and y.

6 Given $x + y = 35$, $\sqrt[3]{x} + \sqrt[3]{y} = 5$ to find x and y.

7 Given $x + y = 5$, $4xy = 12 - x^2y^2$ to find x and y.

8 Find two numbers in the ratio of 5 to 6 and whose sum is 121.

9 How many terms of the series 24, 20, 16..... must be taken that the sum may be 72?

10 Insert 6 geometric means between 56 and $-\frac{7}{16}$.

PLANE GEOMETRY

1 The diagonals of a parallelogram bisect each other.

2 The sum of the exterior angles of a polygon, made by producing each of its sides in the same direction, is equal to four right angles.

3 An inscribed angle is measured by one-half of the arc intercepted between its sides.

4 An angle formed by a tangent and a chord is measured by one-half the intercepted arc.

5 If two chords intersect each other in a circle their segments are reciprocally proportional.

6 If four quantities are in proportion, then like powers, or roots, are in proportion.

7 The area of a trapezoid is equal to one-half the sum of the parallel sides multiplied by the altitude.

8 Prove that the line joining the middle points of the parallel sides of a trapezoid divides the area into two equal parts.

9 Similar segments are to each other as the squares on their radii.

10 Find the side of a square equivalent to a circle whose radius is 40 feet.

SOLID GEOMETRY

1 Every point in the plane which bisects a dihedral angle is equally distant from the faces of that angle.

2 The sum of any two face-angles of a triedral angle is greater than the third.

3 Define prism; right prism; truncated prism; parallelopiped; right parallelopiped; rectangular parallelopiped.

4 The lateral area of a prism is equal to the product of the perimeter of a right section by a lateral edge.

5 The volume of a triangular pyramid is equal to one-third of the product of its base and altitude.

6 Find, in square feet, the surface of a cubical cistern whose contents are 373,248 cubic inches.

7 The sum of the angles of a spherical triangle is greater than two, and less than six, right angles.

8 A lune is to the surface of the sphere as the angle of the lune is to four right angles.

9 Find the total area of a frustum of a cone of revolution, the radii of its bases being 9 and 4 feet and its height 12 feet.

10 Find the area of a spherical triangle each of whose angles is 70° on a sphere whose surface is 144 square inches.

UNITED STATES HISTORY

1 What were the circumstances and ideas which especially gave encouragement to Columbus in his plans for a voyage westward to India?

2 What especial importance attaches to the voyages of Vespucci and Vasco da Gama?

3 Give an account of the settlements made under the London Company?

4 Write a brief sketch of the influence of the Quakers on political and social life in America?

5 How did Queen Anne's War affect the claims of England and France to territory in America?

6 Give five of the charges against the King of England enumerated in the Declaration of Independence.

7 Give an account of the acquisition of Louisiana territory.

8 What was the nature of the trouble between France and America between 1796 and 1800?

9 What was the nature of the Kansas-Nebraska struggle?

10 Write a brief sketch of the public services of Hamilton, Benton, Webster.

ENGLISH GRAMMAR AND LITERATURE

1 Give the rules for the use of capitals.

2 Name and define the parts of speech.

3 What is (*a*) the gender of *sun, anger, war, nature, peace, ship, ox;* (*b*) the plural of *solo, valley, staff, penny, radius, court-martial, sheep?*

4 Give the list of pronouns. Inflect the simple personal pronouns of the third person.

5 Parse each word in the sentence, "Sir, the book was published in order to be sold."

6 Name ten marks of punctuation and explain briefly the use of each.

7 Which of the "books announced" have you (*a*) read, and (*b*) studied?

8 Milton's Lycidas: what kind of a poem; the occasion of it; how does Milton show his Puritanism in it? Give the meaning of the words *hearse* and *rathe*.

9 Explain these quotations from Lycidas: (*a*) "Sisters of the Sacred Well;" (*b*) "Strictly meditate the thankless Muse;"

(*c*) "The dear might of him that walked the waves;" (*d*) "The sun hath stretched out all the hills."

10 Write an essay (of about 150 words correctly spelled, punctuated and paragraphed) on "The First Two Chapters of *The Vicar of Wakefield*."

CHEMISTRY

1 Distinguish chemistry from physics.
2 Describe preparation and properties of chlorine.
3 Describe the making of sulphuric acid; draw apparatus.
4 Give Avogadro's hypothesis.
5 Complete the equation $NaCl + H_2SO_4 =$
6 How is copper obtained from its ores?
7 What is common soda? how is it prepared?
8 How is tin obtained from its ores
9 How is aluminum obtained from its ores?
10 Name some important compounds of aluminum.

PHYSICS

1 What is the unit of work, and the unit of power?
2 How is the advantage of a set of pulleys reckoned?
3 Does a body thrown upward come down as quickly as it goes up? Explain your answer.
4 What are the essentials of an air pump?
5 State the velocity of sound in air; and the effect of changes of temperature.
6 State some ways of magnetizing steel.
7 Explain the construction and operation of some electrical machine not containing magnets.
8 What are the items of an ordinary telegraph circuit?
9 How are the fixed points of a thermometer obtained?
10 State the facts and laws of boiling.

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Rutgers College Preparatory School

Founded 1766

ELIOT R. PAYSON, PH.D., HEAD-MASTER

This school is under the direction of the Trustees of Rutgers College, and prepares boys for any American college or scientific school.

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